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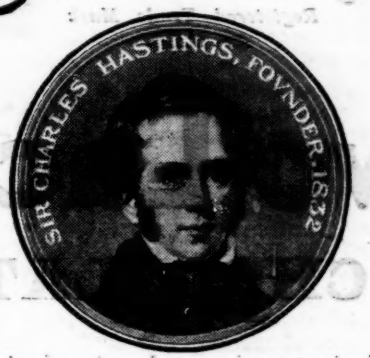

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OF THE

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Held at Portsmouth, July, 1923.

PROCEEDINGS OF SECTIONS.

SECTION OF PATHOLOGY AND BACTERIOLOGY.

HUGH MACLEAN, M.D., D.Sc., President.

DISCUSSION ON DISEASES OF THE STOMACH, WITH SPECIAL REFERENCE TO MODERN METHODS OF INVESTIGATION.

OPENING PAPER

BY

CHARLES BOLTON, M.D., D.Sc., F.R.C.P., F.R.S.,
Physician, University College Hospital.

THE study of the pathological processes occurring in the stomach in functional disorder and in organic disease some few years ago received a decided impetus in the investigation of disordered motor function by the employment of the *x* rays; and more recently also the study of the secretory alterations has been similarly advanced by the introduction of the fractional test meal. The *x*-ray method has become firmly established and the value of the findings gained by it definitely assessed. The fractional test meal will also eventually take its place as an important method in the accurate study of gastric maladies; but since there are several points of fundamental importance relating to it which admit of debate, and since a good deal of fractional work is now being done in this country, the present time seems most opportune for a discussion on the results so far obtained by this method. The method of the estimation of the alveolar CO_2 tension during digestion as an index of the output of acid or alkali from the blood has been found by Dodds, who introduced it, to furnish information confirmatory in many ways of that obtained by the fractional test meal. This method will no doubt be fully referred to, particularly in connexion with the secretion of pancreatic juice.

The Curves of Free HCl and Total Acidity Described by Rehfuss.

In 1914 Rehfuss in America introduced the method of extracting small fractions of the stomach contents every quarter of an hour after a test meal for the estimation of the percentages of the free HCl and the total acidity, the percentages of which could thus be plotted out as curves. It was found that the average normal curve rises gradually to a maximum and drops again, forming a single peak as the stomach empties, the apex of which is reached at different periods during digestion in different cases, and the descending limb of which may or may not have reached the base line when the stomach is empty. The height reached by the apex of the peak varies between about 50 and 60. Such curves are regarded as representing the course of gastric secretion and are known as iso-secretory curves. (Fig. X.) Hypersecretory and hyposecretory curves are those which reach higher than or fail to reach the iso-secretory level. Sometimes the curve never descends, or may continue to rise so that its highest point occurs when the stomach is empty. Such curves, which are regarded as variants of the hypersecretory type, have been called by Bennett and Ryle the "climbing type" of curve.

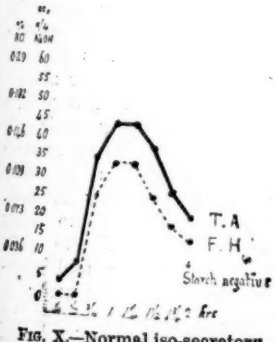

FIG. X.—Normal iso-secretory curve (Crohn and Reiss). T.A., Total acidity. F.H., Free HCl.

A large amount of work has been done in America and England in the study of these curves in different physiological and pathological conditions of the body, and as modified by drugs. From the purely clinical point of view these observations have proved of considerable value in diagnosis. The method is simple and the estimations easily and quickly done. It gives information with regard to the amount and character of the fasting contents—in some cases the duration of the secretory activity of the stomach, the percentages of free HCl and total acidity at different periods of digestion, the time of emptying of the stomach, and the presence and time of appearance in it of bile and mucus. This method is, however, not sufficiently accurate for the scientific investigation of the chain of pathological events taking place in the stomach, because it deals only with the free HCl and neglects the protein HCl, and, more important still, the HCl which has been neutralized by alkaline salts and transformed into inorganic chloride. It is true that the percentage of protein HCl may be assumed more or less from that of the total acidity, but no account whatever is taken of the neutralized HCl in the form of inorganic chloride. We have thus no idea of the percentage of total HCl secreted, since the inorganic chlorides commonly form a considerable proportion of this total, and these curves of free acidity cannot therefore be spoken of as secretory curves at all. They merely represent the excess of acid which is unneutralized in the stomach contents. This neutralization process cannot be left out of account, because it normally regulates the acidity of the stomach contents, and in morbid processes this self-regulative mechanism is interfered with by definite causes and with the production of well defined results. It is the chief factor in modifying the curve of acidity.

The Self-regulation of the Acidity of the Stomach Contents.

In 1915 Boldyreff advanced this hypothesis. His evidence was based upon animal experiments. He found that when acid solutions were introduced into the fasting stomach of the dog they were rapidly neutralized down to a fixed level of 0.15 to 0.2 per cent. HCl, the total chlorides remaining always at the same level. By a series of careful experiments Boldyreff proved that this neutralization was due to regurgitation of pancreatic juice from the duodenum, and he foretold that such would be found to be the case in the digesting stomach.

Bolton and Goodhart in 1922 took up this point and, by making complete chloride estimations every quarter of an hour, definitely proved that, when the percentage acidity in the digesting stomach contents reaches a certain average height, regurgitation of duodenal contents occurs and brings down the acid curve by neutralization. It is, therefore, a function of the pylorus to regulate the acidity of the gastric contents.

Interpretation of the so-called Secretory Curve of Rehfuss.

When the ordinary gruel meal is used the percentage of total chlorides present (that is, free HCl + protein HCl + inorganic chlorides) represents as nearly as possible the percentage of total HCl secreted. There is a small percentage of chlorine in the other digestive juices which amounts to about 0.1, so that these fluids merely act as diluents and lower the total and inorganic curves rather less than distilled water would. The curve of total chlorides is the real secretory curve as nearly as can be obtained. It rises up with varying degrees of rapidity and remains at its high level as the stomach empties.

The rise in the acid curve undoubtedly indicates addition of HCl to the stomach contents, and it corresponds with the rise in the total chloride curve: it means that secretion of gastric juice is in progress. The fall in the acid curve does not, however, mean that secretion has stopped, because in this event the percentage of HCl would remain constant

and the rest of the curve would draw a horizontal line as the stomach empties. It means that the percentage of HCl is decreasing owing to neutralization by an alkali, because as the acid curve descends the inorganic chloride curve rises and the two cross one another. (Fig. 1.) Sodium chloride has been formed by neutralization and increases in amount as the acid decreases; the sodium chloride curve thus represents the curve of neutralization, which in its turn depends upon relaxation of the pyloric sphincter. The fall in the HCl curve and the concomitant rise in the NaCl curve thus result from pyloric relaxation and duodenal regurgitation and are a measure of the degree of pyloric tonus. In those cases in which the acid curve does not fall the inorganic curve remains low during the whole period of digestion, showing that in these people pyloric tone is abnormally maintained. (Fig. 2.) It must not be supposed that duodenal regurgitation occurs at the same time and to the same extent in all individuals with the normal type of curve, because this is not the case, as the great variations in the curves demonstrate. We can, however, state, using Bennett and Ryle's figures, that in about 90 per cent. of normal individuals the amount of gastric juice secreted and the degree of duodenal regurgitation vary within certain limits, but that they all conform to a common type: in about 5 per cent. duodenal regurgitation is abnormally defective; and in a few people congenital achylia is present, which condition has been recognized for some years.

There are great difficulties in the way of the investigation of disorders of function of the stomach, because the deviation from the normal and the return to it must vary in accordance with the type to which the patient normally belongs and of which we are ignorant. We must also remember that we investigate our cases with a comparatively non-irritating standard fluid and that this is a very imperfect test of the manner in which the stomach reacts to ordinary food of different kinds. Neither is our method of collection of the gastric contents during digestion an ideal procedure.

Acid Dyspepsia: Hyperacidity of the Gastric Juice: Hyperchlorhydria.

The functional disorder of the stomach to which the above names have been given is a well defined and easily recognizable malady. It is the commonest form of irritability of the stomach. It was formerly thought that the percentage of HCl in the human gastric juice was about 0.2, and this statement may still be occasionally found in recent textbooks. It was, and is at the present time by many, considered that a percentage of 0.25 total HCl and above in the gastric contents indicates a pathological excess of HCl in the gastric juice, and that this excess is the primary and essential cause of hyperchlorhydria. The fact is, however, that the human gastric juice contains the same percentage of HCl as that of animals—namely, 0.4 to 0.5—and that the percentage of HCl in the gastric contents represents the percentage of this acid in a mixture of gastric juice and food. In a series of unpublished experiments by E. K. Martin and myself it was found that after feeding on Glaxo the percentage of HCl in the gastric contents of cats never rose above a maximum of 0.12, although the pure juice obtained from a Pavlov fistula at the same time was constantly in the region of 0.4. The only primary alteration in the gastric juice which affects the percentage of HCl in the stomach contents is that in the quantity secreted. In the condition of hypersecretion there may be an increase in the average percentage in the stomach contents, but this is not necessarily so. If the gastric contents leave the stomach more rapidly than usual the HCl percentage also tends to rise above the normal average, but neither of these two factors is the common cause of the functional disturbance under discussion, because there is hypersecretion only in a certain number of cases and the food does not usually leave the stomach more rapidly than normal. Neither is the high acidity maintained in these two conditions unless there is pyloric hypertension. The essential cause of hyperacidity of the gastric contents is a deficiency in the neutralizing process which regulates the acidity of the contents and keeps the percentage of HCl at about 0.2. Duodenal regurgitation of the intestinal contents fails to occur during digestion in the normal fashion, with the result that the HCl curve continues to climb till the stomach is empty; or it may draw a more or less horizontal line, or it may show one or more dips owing to partial neutralization attempts. (Figs. 2, 3, 4.) The cause of this deficient regurgitation is irritability of the pyloric sphincter leading to deficient relaxation or spasm. The actual height of the HCl curve is not a matter of great significance. The important point to note is that the condition "hyperchlorhydria" is the result of neuro-muscular irritability of the stomach in which the pylorus plays the chief part.

The Cause of Pyloric Hypertension.

The irritability of the pylorus varies in normal individuals to some extent, so that there is a considerable latitude in the normal degree of pyloric tone, and hence the variations in the normal type of curve which are acknowledged to occur by all.

This irritability of the pylorus may be increased by one of two causes: (1) local disease in the vicinity—for example, ulcer; (2) irritability of the central nervous system, often produced reflexly. Even when either of these conditions is present it does not follow that the pylorus is unable to perform its functions normally, because it is one of the facts of medicine that in such diseases the disturbances of gastric function calling attention to them commonly appear only from time to time, and it is quite easy to relieve the patient although the diseased condition is still present. In 1920 Crohn and Reiss found that improvement in the symptoms of patients of this type depended upon the relief of pyloric spasm, and not upon alterations in the acidity of the contents or hypersecretion alone. Whether one is dealing with (*a*) a normal individual in the first instance, or (*b*) a person the subject of one of the two above pathological conditions, the exciting cause of the excessive pyloric hypertension is twofold; (1) food irritation, mechanical or chemical; (2) HCl. In proportion as the pylorus is irritable there is need of a smaller exciting cause: (1) The pylorus has a remarkable selective power. It is the regulator of the output of the stomach and holds up imperfectly disintegrated food and hard and irritating substances, whilst it lets pass finely divided and non-irritating materials and fluids. When such food is present in the stomach, the pylorus being particularly sensitive to it, the emptying of the stomach is delayed, and duodenal regurgitation necessary to neutralize the acid contents is prevented. Peristalsis increases and the intragastric pressure rises, regurgitation of the acid contents occurring into the lower end of the oesophagus or into the mouth. Our methods are unable to demonstrate all these changes, which vary from day to day according to the fatigue of the patient, the state of the nervous system, and the quality of the food eaten. (2) The part played by the HCl is not so simple. Normally the pylorus responds to the HCl in the stomach contents, relaxing in the presence of acid in the stomach and contracting when the duodenal contents are acid. In diseased conditions, however, it is perfectly well able to function normally either in the entire absence of HCl or in the condition of hypersecretion. The pylorus has therefore adapted itself to the new secretory conditions, but this only applies to a pylorus which is not in an irritable condition, for in this state of irritability its adaptability disappears and it reacts to free HCl as to other irritants. HCl in weak solution is a powerful irritant to living tissues. Nervous hypersecretion is thus likely to cause pyloric spasm and hyperacidity of the contents, and hyperacidity resulting from food irritation materially assists in keeping up the pyloric hypertension.

There are two methods of drug treatment of this condition of hyperchlorhydria which are interesting. (1) By the administration of alkalis one and a half to two hours after meals, which replaces the deficiency in duodenal regurgitation and relieves the symptoms. Crohn has shown that this is the correct time to give alkalis, because if taken at an earlier stage, when the acid curve is rising and secretion very active, alkalis simply cause a drop in the

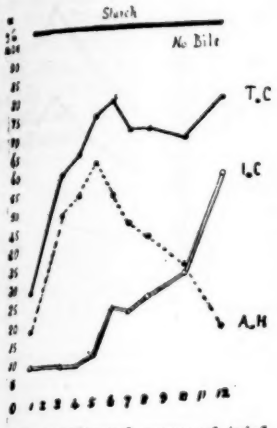

FIG. 1.—Normal curve of total chloride (T.C.), inorganic chloride (I.C.), and active HCl (A.H.) (= protein HCl + free HCl).

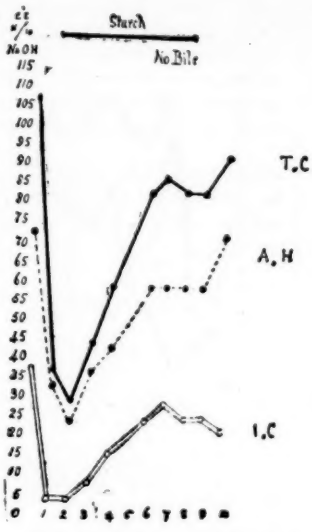

FIG. 2.—Functional disorder: Symptoms of hyperchlorhydria.

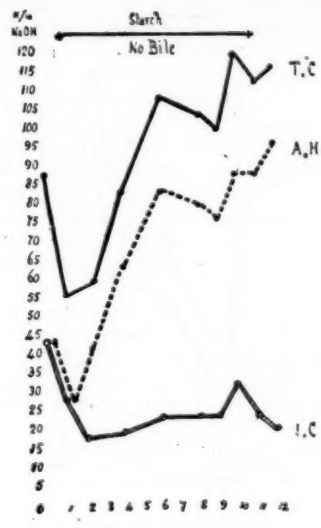

FIG. 3.—Duodenal ulcer.

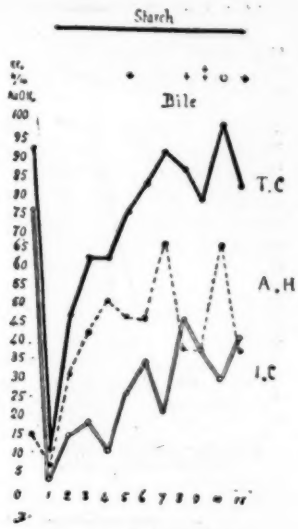

FIG. 4.—Pyloric ulcer.

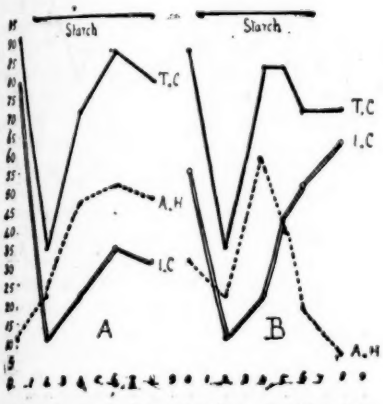

FIG. 5.—A, Before atropine. B, Atropine 1/50 gr. a quarter of an hour before each meal for three days before curve taken.

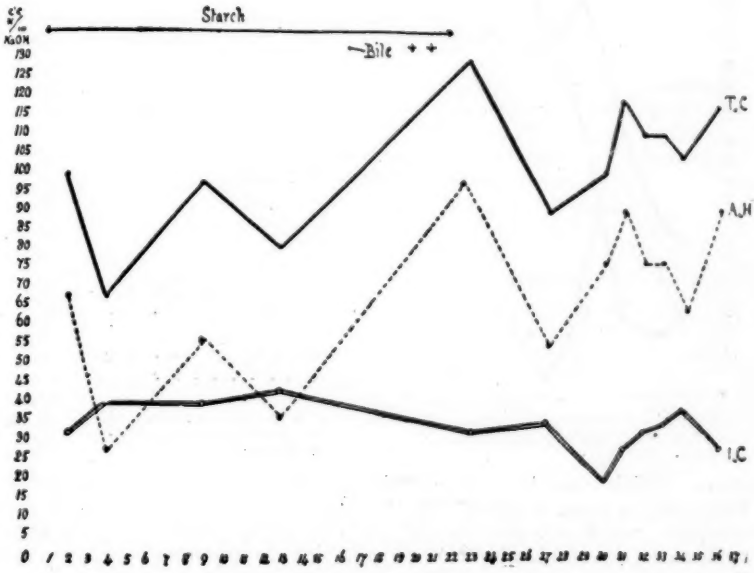

FIG. 6.—Hour-glass stomach (ulcer), proximal sac: Hypersecretion.

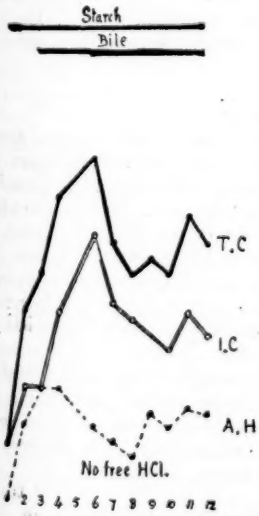

FIG. 7.—Excessive neutralization: Functional disorder. (A. H., entire y protein HCl.)

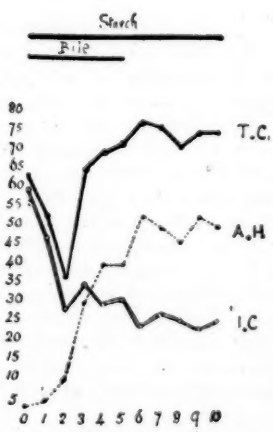

FIG. 8.—Pyloric obstruction (ulcer).

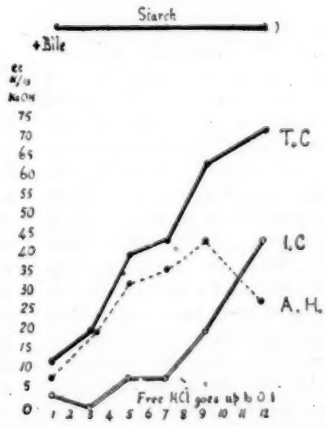

FIG. 9.—Hyposecretion: Functional disorder.

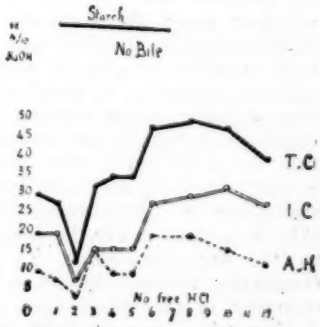

FIG. 10.—Hyposecretion, excessive neutralization: Functional disorder.

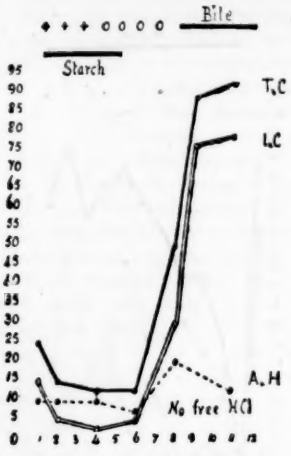

FIG. 11.—Achylia gastrica: Pernicious anaemia.

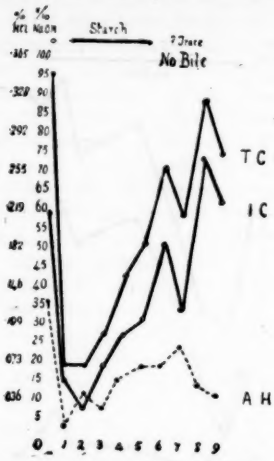

FIG. 12.—Cancer of stomach; diminished secretion; excessive neutralization.

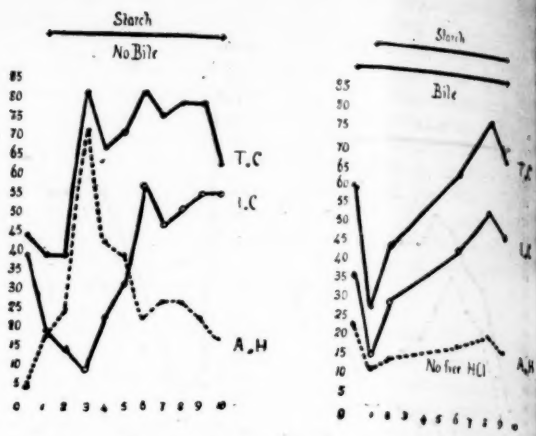

FIG. 13.—A, Slight hour-glass stomach, before operation. B, After partial gastrectomy; jejunum joined to stomach.

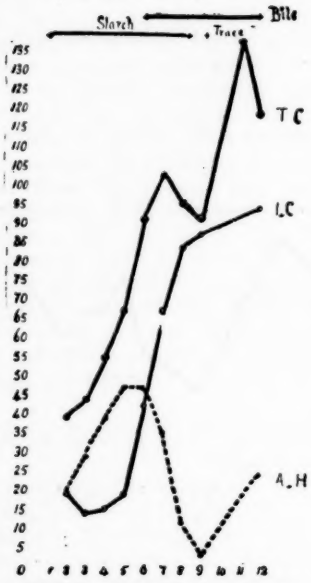

FIG. 14.—Unsuccessful gastro-jejunostomy; imperfect neutralization.

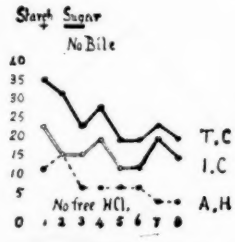

FIG. 15. — Cancer of stomach; secretion practically absent.

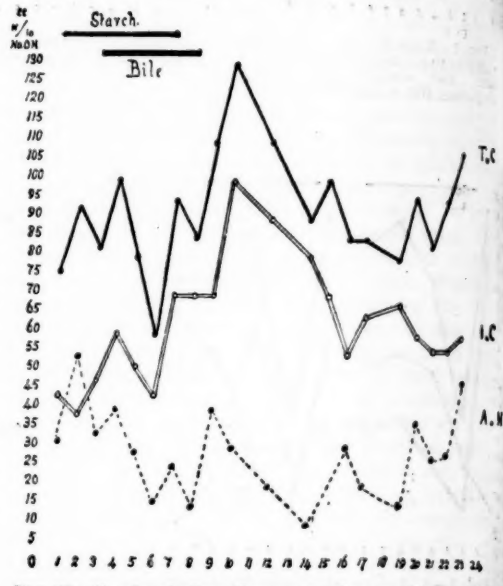

FIG. 16.—Duodenal ulcer; hypersecretion; no hyperacidity; excessive neutralization; rapid emptying.

curve, which usually rises a trifle higher subsequently. Digestion is thus delayed. (2) By the administration of atropine, which relaxes the pylorus and brings down the acid curve by neutralization, in addition to diminishing the secretion.

Action of Atropine.

Since the introduction of the fractional meal many observations have been made with this drug and conflicting results obtained. Unfortunately most observers have taken a diminution in acidity of the gastric contents to indicate a diminished secretion, but, as we have seen, this view is erroneous. We have to consider two distinct points: (1) whether the acidity of the gastric contents is diminished by atropine, and (2) whether the amount of gastric juice secreted after the stomach is empty is also diminished. With regard to the first point, there is no doubt whatever that atropine is able to modify the acidity curve of the gastric contents. A complete chloride analysis will show that a rising curve may be converted into a single peak curve which falls in the normal manner. As the HCl curve falls the NaCl curve rises, showing that the fall in acidity is due to neutralization by pyloric relaxation and duodenal regurgitation. An abnormal acid curve has been converted into a normal curve by relaxation of the pyloric spasm by the atropine. (Fig. 5.) The total chloride curve is frequently lowered by about 10 or 20, showing that the secretion is also diminished. The correct method of estimating whether or not the gastric juice secreted in the *fasting* stomach is diminished by atropine is to continue the collection of the secretion after the stomach has emptied. Crohn was the first observer who found that this secretion could be stopped by giving very large doses of atropine. We may conclude that atropine diminishes the gastric secretion more particularly in the fasting stomach, but the benefit it produces during digestion is perhaps rather due to its power of relaxing the pylorus and restoring the normal duodenal regurgitation. Uniform results are not obtained in all cases, neither does atropine invariably relieve the patient.

Pyloric Obstruction.

Very little need be said about pyloric obstruction except that it exhibits in a striking way the effects upon the various curves of the limitation of duodenal regurgitation, its effect being a purely mechanical one. When the stricture is marked the total chloride curve tends to reach its height fairly early, as in cases of hypersecretion, and also to maintain its high level. The acid curve remains parallel with it more or less. The NaCl curve is usually low from the first. Duodenal regurgitation occurs to a slight extent but it is irregular and spasmodic. The curves indicate a steady output of secretion with small irregular neutralizations. The fasting stomach contains mixed pancreatic and gastric juices with food remnants, the amount of each depending on the degree of stenosis. All degrees of neutralization occur in slighter cases. (Fig. 8.)

Hour-glass Stomach.

A slight degree of hour-glass contraction shows a perfectly normal curve like that of an ulcer of the body of the

omach, but when it forms a tight constriction the same echanical effect is seen as in pyloric obstruction. The ffect of duodenal regurgitation is not felt in the proximal c. No typical fall in the acid curve due to neutraliza- n is seen; the total chloride and acid curves maintain eir heights and the inorganic chloride curve remains w. The delayed emptying of the proximal sac may lead hypersecretion. (Fig. 6.)

The effects of stricture at the outlet or in the body of the omach are therefore purely mechanical; the emptying of e stomach is delayed and hypersecretion set up, whilst eutralization is prevented.

Subacidity: Hypochlorhydria, Achlorhydria, Achylia.

The value of a complete chloride analysis is nowhere ore strikingly exhibited than in the condition of sub- idity, because if the free HCl and total acidity curves are one considered one may conclude that very little or no stric juice is being secreted, whereas it may be normal or erely diminished in quantity. As the result of our obser- tions we recognize the following conditions as constituting bacidity:

1. Excessive neutralization of the gastric juice, which may be in normal or diminished quantity.
2. Simple diminution in the amount of gastric juice secreted—hyposecretion.
3. Absence of gastric juice—achylia gastrica.

1. *Excessive neutralization* of the gastric juice is demon- rated by the large increase in the amount of inorganic loride present as compared with the diminution in the mount of protein HCl, free HCl being absent. A charac- ristic feature of the curves is that the inorganic chloride rve is higher than the acid curve usually during the hole of digestion, and it is uncommon for these two curves cross as is normally the case. When the gastric juice being secreted in normal quantity, but is excessively utralized, the total chloride curve rises to from 60 to 90. he rise occurs in the normal fashion, and is accompanied y a corresponding rise in the inorganic chloride curve. he protein HCl curve is below the inorganic curve, but e two may cross as in normal cases. Free HCl is absent. ile may be constantly present or appear very early. ormal amounts of fluid are extracted. (Fig. 7.) The use of this excessive neutralization is to be found in creased duodenal regurgitation owing to the pylorus ing hypotonic. A definite relaxation does not usually cur at a given point, but excessive regurgitation appears stantly to occur from the beginning. The stomach is mmonly found atonic with diminished peristalsis.

2. *Simple diminution in the amount* of gastric juice creted is demonstrated by the total chloride curve anding at 60 or below while the stomach contains food; herwise the curves are like the normal but lower, and ee HCl may be present or absent. (Fig. 9.) If the diminu- n be considerable, curves indicating excessive neutraliza- n appear, as a normal duodenal regurgitation will pro- ce this effect. The total chloride curve stands below 60 hen the stomach contains food and the amounts extracted re small. The total and inorganic chloride curves in this se rise very slowly to the end; the protein HCl curve is ular and the lowest of the three. Free HCl is absent. Fig. 10.) In cases of hyposecretion with absence of free Cl the gastric glands may sometimes be stimulated into creased activity by giving a meat meal.

3. *Achylia Gastrica.*—Free HCl is absent in all cases, but otal absence of protein HCl is uncommon in our experi- ce. There is usually present a small amount, perhaps or so—a mere trace. The stomach usually empties pidly in three-quarters of an hour to an hour, the antity extracted is small, and the total chlorides low in rcentage—under 30—the curve practically drawing a aight line. After the stomach has emptied there may no residue or small amounts may be obtained. If there sufficient for analysis this residue may show a high total oride content, sometimes almost within normal limits. such cases small amounts of gastric juice are being reted. (Fig. 11.) The term "achylia" should, speaking strictly, be limited to an entire absence of gastric juice, which, as an acquired abnormality, must be rare, and probably most of such cases are congenital.

The three well known diseases in which subacidity of the gastric contents occurs are cancer of the stomach, gastritis, and pernicious anaemia.

Cancer.—Both the current views with regard to the effects of cancer are undoubtedly correct. It diminishes the secretion and in addition excessive neutralization occurs in some cases, but our curves do not show whether this is due to duodenal regurgitation or discharge from the growth. Some cases show a normal secretion with or without duodenal neutralization. (Figs. 12, 15.)

Gastritis.—In all cases, acute or chronic, the effect is a diminution in the amount of gastric juice secreted. It is true that in some cases of chronic gastritis there is an increase in the percentage of HCl in the contents and also hypersecretion of the gastric juice. Such cases have been called "acid gastritis," and are supposed to be an early irritative stage of chronic gastritis. Such a condition is commonly seen in chronic gastric ulcer. In 1915 I was able to demonstrate that the administration of HCl in strengths of 0.28 per cent. and upwards produced gastritis and follicular ulcers in the monkey's stomach. It appears to me that the relationship of hyperacid gastric contents or hypersecretion to gastritis is twofold: (1) the HCl is the cause of the gastritis; (2) the two are the result of a common irritant. There is no evidence whatever to show that gastritis is able to increase the amount of gastric juice secreted.

Pernicious Anaemia.—The secretion in this disease is practically absent and it is not a question of neutralization. (Fig. 11.)

A functional hyposecretion appears to be a secondary result of some general bodily and nervous debility often associated with the voluntary cutting off of food, as there is no definite evidence that hyposecretion is a primary functional derangement of the stomach.

Gastric Acidity following Gastro-enterostomy and Allied Operations.

Following gastro-enterostomy the secretion of gastric juice remains unchanged, any alteration in the acidity curves being due to neutralization by regurgitation of intestinal contents through the stoma, as Willcox showed in 1909. Two types of curves are recognized:

1. In a successful gastro-enterostomy practically complete neutralization occurs. This is shown by the height of the total chloride and inorganic curves. Except for a slight rise in the beginning of digestion the HCl curve is at zero. (Fig. 13.)

2. In other cases the acid curve is practically of the same type as it was before the operation—these cases are those which develop jejunal ulcers owing to the presence of free HCl in the jejunum, and are more particularly seen after gastro-enterostomy for duodenal ulcer. This condition is due to deficient regurgitation through the stoma. The total chloride curve keeps uniformly high and the inorganic chloride curve low. If the acid curve does not fall the inorganic chloride curve is low the whole time, but if the acid curve falls the inorganic chloride curve rises and crosses it. The fault is in the stoma, which acts as a sphincter and prevents regurgitation and neutralization. (Fig. 14.)

Gastro-enterostomy, therefore, relieves the patient not only by facilitating the emptying of the stomach in pyloric obstruction, but also by allowing free regurgitation of intestinal contents, thereby neutralizing the HCl in the stomach, as Paterson has maintained since 1909. Excision of the pylorus will probably prove eventually to be the better operation for this reason.

Hypersecretion of Gastric Juice.

A general consensus of opinion has not yet been arrived at with regard to what actually constitutes hypersecretion. It is generally assumed that if an amount of resting juice (that is, that present before breakfast) above the normal is extracted, a continuous hypersecretion is present. The point in dispute is what amount should be regarded as the normal.

If the figures of Rehfuss be accepted about 40 per cent. of normal people have hypersecretion, for he found amounts varying from 20 to 120 c.cm. with an average of 50 c.cm. In 1921 Crohn disputed these results, and stated that in the normal the amount was rarely over 30 c.cm., regarding anything above this as constituting hypersecretion, and with this we agree. In the absence of hypersecretion after the stomach is empty very little can be extracted from it, because only a very slow and small secretion occurs in the fasting stomach. This is added to by swallowed saliva and duodenal regurgitation of intestinal contents in unknown amounts, which partially neutralize it. The pylorus allows this to pass out from time to time. Some hours after a meal the resting stomach may thus contain variable amounts of mixed secretions, depending in quantity and composition very largely on the gastric movements, and it may be roughly taken that amounts over about 30 c.cm. indicate hypersecretion. If, however, we simply trust to the amount of resting juice we shall fall into error, because the hypersecretion may not be continuous, but only occur during digestion and for a variable number of hours afterwards; and hence the importance of leaving the tube *in situ* for collection of the juice after the stomach is empty.

With regard to the type of curve during digestion there is only one feature that is suggestive of hypersecretion, and that is a rapid rise in the total chloride curve, with or without a similar rise in the HCl curve in the early stage of digestion when the stomach is full, provided that the organ is not emptying rapidly. The height of the curve later, or whether it falls or rises or remains horizontal, is of no significance for the recognition of hypersecretion. In other words, one is not justified in speaking of a hypersecretory curve; the shape of the curve is determined by the degree of tone of the pylorus. A rapid rise in the HCl curve may occur at the beginning, and a fall as rapid occur due to neutralization, or the curve may be of the climbing type. The contents are watery-looking and copious, the proportion of gruel being smaller than normal. When all the starch has left the stomach the secretion continues in the same amount with the same watery appearance. The analysis of this fluid is interesting. The total chloride curve keeps more or less constantly high. The actual height of the acid curve varies in different cases, but tends to keep constant for the same individual, as the secretion of gastric juice is constant, and the neutralizing process, owing to pyloric relaxation, is also constant for the same person. (Figs. 6, 16.)

During digestion the acid curve may never rise to a high level at all whatever its shape. This is due to a steady regurgitation through the pylorus keeping down the acidity. The hypersecretion is, however, proved by the continued secretion after the stomach is empty or by removing a large amount at this period. In other words, hypersecretion may or may not be accompanied by hyperacidity of the gastric contents. The emptying time is not necessarily altered in either direction by hypersecretion, but depends upon the type of case in which it is occurring. (Fig. 16.)

The gastric juice is normally secreted in response to stimuli transmitted from the central nervous system through the vagi and also to chemical stimuli as the result of the presence of digesting food in the stomach. Hypersecretion originates as an exaggeration of one or other of these two mechanisms. It occurs in irritable conditions of the central nervous system, either primary or induced by abnormal stimulation of the afferent fibres from some portion of the digestive tract. In this case the secretion is characteristically continuous and the fasting juice excessive in amount. If the central nervous system is affected primarily the hypersecretion is liable to occur in spasmodic attacks—so-called periodic secretion.

Hypersecretion also originates during the digestive process as the result of retention of food in the stomach. In these cases the secretion outlasts the emptying of the stomach for a varying number of hours, when it falls off and the resting juice may or may not be present in normal quantity.

The relation of gastric and duodenal ulcer to hypersecretion is not a simple one. The chief effect of an ulcer is to produce a local spasm in its vicinity; at the pylorus it produces pyloric spasm, in the body of the stomach a ring spasm, and finally obstruction at either point. (Figs. 3, 4, 6, 8.) The effect of this is deficient neutralization and the condition of hyperacidity of the stomach contents in pyloric obstruction, and a similar state of affairs in the proximal sac of an hour-glass stomach. Hypersecretion is finally set up. It is held by some that the ulcer produces a reflex hypersecretion, but if this were so it should occur whether spasm were excited or not and especially in acute ulcer, but this is not the case. When hypersecretion occurs in gastric or duodenal ulcer in the absence of food retention it may equally well be asserted that an ulcer has occurred in a person suffering from gastric irritability and hypersecretion, the latter being a factor in the production of the ulcer. I am inclined to this view, which I expressed in 1915, as the result of my experiments demonstrating the marked influence of HCl in facilitating the formation and delaying the healing of ulcers.

DISCUSSION.

Mr. HERBERT J. PATERSON confessed to a strong belief in the value of the old-fashioned test meal. After all, what was needed was a comparison of the working of one stomach with another, and if the test meal was given properly—that is, if the amount and quality of the test meal were uniform, and if it were drawn off at the exact time—it was a most valuable help in diagnosis. He thought the value of test meals was underrated because it was forgotten that chemistry was an aid to but not a substitute for clinical observation. It was useless to send a test meal to a pathologist and expect him to make a diagnosis as the result of his examination. A test meal result must be read in conjunction with the history and clinical examination of the patient. Much more would be learnt if the physician or surgeon examined the test meal himself. The smell and appearance were often such as to suggest carcinoma. Great as was the value of the test meal in diagnosis, it was of even greater value in controlling the diet of a patient after gastro-jejunostomy. It was the only means of determining how far the acidity of the gastric contents had been reduced, and so the only guide as to the nature of the diet which should be allowed. Dr. Bolton's experiments confirmed the view he had advocated for many years—that gastro-jejunostomy was a "physiological" operation. Gastro-jejunostomy reduced the acidity of the gastric contents by allowing the entrance of pancreatic juice into the stomach through the anastomosis. This neutralization might not occur if the stoma were too small or wrongly placed. He was in favour of anterior gastro-jejunostomy because it allowed greater regurgitation of pancreatic juice in the early days after operation; this greater regurgitation occurred, he thought, because in the anterior operation the circular muscular fibres of the stomach were divided to a greater extent than in the posterior operation, and therefore there was less likely to be a sphincteric action at the stoma. If it were true that gastro-jejunostomy was a physiological operation, then excision of the pylorus as a routine measure, as suggested by Dr. Bolton, was unnecessary.

Dr. J. A. RYLE drew attention to certain observations, other than purely chemical observations, which might and should be made in specimens withdrawn for purposes of gastric analysis. These would be particularly of value if the physician or surgeon was able himself to inspect the specimens from his own cases. The resting secretion provided not a little valuable information. In addition to its chemistry, which was subject to great variations, observations might be made in regard to its amount, consistency, naked-eye appearance, odour, and cytology. A clear, limpid, highly acid resting juice in amounts above 50 c.cm., and sometimes above 100 c.cm., was more commonly encountered in duodenal ulcer than in any other condition, and was frequently associated with a clear and copious after-secretion. In conditions of complete achlorhydria, such as occurred in Addison's anaemia, subacute combined degeneration of the cord, and chronic

gastrogenous diarrhoea, only a few cubic centimetres of mucoid juice like white of egg might be obtained. The presence of blood in leucocytes in chronic gastritis, and food débris in pyloric growth obstruction, afforded further useful information. The rate of emptying might be very accurately ascertained by the fractional method, and was closely comparable with the rate of emptying as estimated radiographically. The amount of the supernatant fluid and the regurgitation of bile in subsequent specimens were further simple macroscopic observations of contributory importance. The fractional test meal could really be regarded as a diagnostic test in one condition, and that was pyloric obstruction. In this condition it might give definite evidence as to the cause of the obstruction. Nevertheless as a gastric efficiency test it was of distinct value in duodenal ulcer, Addison's anaemia, and chronic gastrogenous diarrhoea. In other reflex dyspepsias, due to disease of the gall bladder and appendix, hyperchlorhydria and achlorhydria both occurred more frequently than in normal series, and probably depended respectively on reflex pyloric hypertonus and chronic infection in the upper gastro-intestinal tract. It should be clearly understood that the fractional test meal was a rough test and that it could only be regarded as accessory to careful clinical investigations. With these provisos it was a test of real utility.

Dr. IZOD BENNETT made remarks which are embodied in the paper printed below.

Dr. H. C. H. BULL said that the researches of Gorham and of Paul White had somewhat altered opinions as to the value of the interpretations put upon fractional test meals. These independent observers obtained similar curves by giving a test meal and withdrawing the meal fifteen minutes later in 10 c.cm. samples, the whole operation occupying only twenty minutes. Their work supported the conclusion that the tube only gave information of the area of the stomach in which it lay, and therefore, as the stomach emptied, the acidity apparently rose. The symptoms of cancer, in which the pathological change was very great, were most insidious in their onset, whereas the reflex dyspepsias, which were most distressing during life, showed little or no change after death. In this latter group of cases the fractional method gave very little help, while in the organic diseases the percentage of error was very high. On the other hand, where there was organic disease, the *x* ray was reliable in over 90 per cent. of cases, and in certain of the reflex disorders also great accuracy of diagnosis could be obtained. At the present time it seemed that the fractional tube was a valuable aid in research, and in the hands of Drs. Bolton, Ryle, and Bennett in this country, and Drs. Rehfuss, Lyon, and others in America, would shed more and more light on the obscure disorders of the stomach; as a clinical aid its usefulness was limited.

Dr. MACKEDDIE was glad to find emphasis laid on what might be called macroscopic gastric tests, such as the residuum, occult blood, aspect, smell, consistency, and so on. Too great a price would be paid for modern clinical laboratory tests if the common special sense education were lost. This should go hand-in-hand with the advanced methods described by Dr. Bolton. The ability to distinguish between the achlorhydria of pernicious anaemia and carcinoma of the stomach was striking, but of little practical value. Could a distinction be made in the large group of non-malignant cases (gout, neurasthenia, and so on) that have no free acid? The method of ascertaining the rapidity with which the stomach emptied by the combined use of *x* rays and fractional test meals was, he believed, very valuable.

Dr. MACKENZIE WALLIS (London) said that so far the discussion had been confined to the use of the fractional method of gastric analysis. The detection of occult blood in the stools had, in his own experience, proved a most valuable individual test as an aid to diagnosis of carcinoma of the stomach. The scheme of investigation he had carried out for some time was as follows: The patient was taken into hospital for a short period and given a diet free from meat and meat products. The stools were examined on several occasions for occult blood, and if the benzidine and pyramidin tests were positive the existence of a bleeding ulcerated surface in the gastro-intestinal tract was no longer in doubt. The analysis of the gastric contents after a test meal provided a means of differential diagnosis between a simple and a malignant ulcer. In cases where doubt existed after a one-hour test meal, then a fractional test meal might prove useful. A combined investigation from every point of view appeared to be warranted in any case of dyspepsia occurring in a previously healthy individual who had passed the age of 40 years.

Dr. HUGH MACLEAN thought that previous speakers had overestimated the value of *x* rays in diagnosis of stomach diseases, for in his experience radiographic examination had often failed to throw any light on obscure cases. He asked whether in pernicious anaemia the secretory changes which often preceded the anaemia were to be regarded in any way as contributing causes to the disease itself. His experience led him to think that surgeons overestimated the frequency with which cancer followed ulceration of the stomach.

Reply.

Dr. BOLTON, in his reply, emphasized the fact that pathological findings must be co-ordinated with clinical observations in order to arrive at a correct diagnosis. He pointed out that the object of research was to investigate the course of disease, and only secondarily to supply tests by means of which disease could be diagnosed. In reply to comments made by contributors to the discussion, he remarked that in pernicious anaemia the secretory disturbances were not necessarily the results of the anaemia, for in some cases the disease might exist in a most pronounced form without any disturbance of gastric secretion. With regard to the frequency with which cancer followed gastric ulcer, he declared that he thought that a generous estimate would be that cancer followed in 7 to 8 per cent. of the cases. The occult blood test was a valuable aid to diagnosis of cancer and ulcer of the stomach, and there was, as a rule, insufficient blood in the stools of a patient with chronic gastritis to give a positive test. In reply to the criticism that the specimens withdrawn by the fractional test method were not fair samples, he reminded his audience that the churning action of the stomach movements must ensure thorough mixing. He agreed that if the stomach be washed out free HCl would be found in the contents of a carcinomatous stomach. The difficulty with regard to the ordinary test meal was to determine the right moment to withdraw the fluid to be tested; it did not arise in analysis by the fractional method, which had already been very useful in the study of gastric diseases; further research would undoubtedly extend the sphere of its utility.

THE EARLY DIAGNOSIS OF CANCER OF THE STOMACH BY MEANS OF GASTRIC ANALYSIS.*

BY

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DURING the past three years I have had the opportunity of performing gastric analysis, by the fractional method, on some three hundred cases, including diseases of many types, at the Middlesex Hospital.

As is always the case when a new method of investigation is introduced, fractional gastric analysis has encountered severe criticism, chiefly at the hands of those experienced in older methods. These criticisms depend chiefly on the fact that the gastric contents are not homogeneous, and if a small sample be removed and analysed it cannot be expected accurately to represent the contents of the

*A contribution to the discussion on diseases of the stomach in the Section of Pathology.

stomach as a whole. There is a measure of truth in this, but the criticism loses force if care is taken to remove a large specimen from time to time, and it must be further recognized that any method, such as the fractional one, in which the whole of the fasting stomach content is removed before the test meal is given must be far more accurate than the ordinary Ewald technique, in which at the end of one hour a mixture of meal with old and recent secretions is removed and examined, without the observer having any information as to what was in the stomach to begin with.

Even if it be claimed and admitted that the fractional method is the most useful of the present means of performing gastric analysis, it must be acknowledged that cases of serious organic disease of the stomach still occur which baffle detection in this way; the explanation is simple: it lies in the fact that serious organic disease of the stomach may occur without any gross alteration in gastric secretion.

There are, however, certain conditions which are almost invariably demonstrable by careful gastric analysis, and it is my purpose in this paper to deal with one, perhaps the most important, of them—namely, carcinoma of the stomach. My experience leads me to believe that it is exceedingly rare for a case of carcinoma of the stomach to present itself for examination without the diagnosis being definitely established as soon as gastric analysis is performed.

Everyone engaged in the practice of medicine is aware of the importance of early diagnosis in this disease, but it is certain that very few appreciate the value of gastric analysis in this connexion.

On referring to a number of the most popular textbooks I have been much impressed with the vagueness of much current medical teaching on the subject. There is a lack of agreement between the various writers, and a hesitancy on the part of most of them, that cannot but make the critical reader doubt whether chemical examination is of real value.

Hurst, writing in Price's *Textbook of Medicine*, says: "The absence of free hydrochloric acid (in cancer of the stomach) is of less value, as achylia may also occur with chronic ulcers of the lesser curvature." Poulton, in Taylor's *Practice of Medicine*, says: "In carcinoma of the stomach there is a great diminution in the 'active HCl' and in the amount of 'free HCl'; but this also occurs in some normal people as well as in the group known as achylia gastrica and in pernicious anaemia and acne rosacea." The last edition of Osler's textbook states: "It may be said that free HCl is absent from a large proportion of all cases of cancer of the stomach. Of 94 cases in which the contents were examined, in 84 free HCl was absent. . . . HCl may be absent in chronic gastritis and in atrophy of the gastric mucosa. The presence of lactic acid is regarded as a valuable sign."

These three statements are fairly representative of the teaching accessible to the average English medical student; they cannot be said to foster a belief that there is any great utility in gastric analysis, and the main impressions they convey are, first, that in most, but not all, cases of gastric cancer, there is no free HCl in the gastric contents; and secondly, that this is similar to what is seen in cases of chronic gastritis, pernicious anaemia, and achylia gastrica.

I believe that I have stated this fairly, and it is certainly the impression that is left after reading accounts in a large number of textbooks, both English and American. I do not, however, believe that it at all conveys the opinion of those who have actual personal experience of gastric analysis, and I can myself state, as the result of prolonged personal investigation, that free HCl is secreted by the stomachs of the majority of patients suffering from gastric carcinoma, and that, even when a patient with gastric carcinoma has complete achlorhydria, the gastric analysis is rarely identical with that given by a patient with pernicious anaemia, chronic gastritis, or any other form of "benign" achylia. Two examples will illustrate this.

CASE I.

J. L., male, aged 58, was admitted to Middlesex Hospital in January, 1923, under the care of Dr. A. F. Voelcker, by whom I was asked to perform gastric analysis. The patient gave a five weeks' history of dyspepsia, unrelated to food; he had on six occasions vomited profusely; visible peristalsis was present. There was a history of syphilis, but the Wassermann reaction was negative. A glass of milk containing 1½ drachms of powdered charcoal was given overnight, and a modified Einhorn tube was swallowed at 9.30 on the following morning. Over a pint and a half of sour-smelling fluid, containing much charcoal, was recovered; no free HCl was present in this; the total acidity was 50. The stomach was then repeatedly washed with water, and the washings at the end of a quarter of an hour contained free HCl 10, total acid 35. It being clear that pyloric obstruction was present, laparotomy was performed three days later by Mr. C. H. S. Webb; a small early carcinoma was found, causing such obstruction that when water was placed in the stomach after excision drops only could be made to traverse the pylorus, though a finger could be readily introduced from the duodenal side. Histological examination confirmed the diagnosis of carcinoma; the main surface of the stomach was normal.

This case illustrates (1) the rapid onset of pyloric obstruction in many cases of gastric carcinoma; (2) the operability of many such growths; (3) that the inhibition of normal secretion may be due mainly to coating of the mucosa with retained products; (4) the production of free organic acids by fermentative bacteria above an obstruction. An Ewald test meal or an ordinary fractional gastric analysis would certainly have shown in this case (1) an absence of HCl just as in a non-secreting achylia gastrica; or (2) a high total acidity quite different from the low total acidity of pernicious anaemia and achylia gastrica.

CASE II.

C. G., a man aged 60, admitted to Middlesex Hospital under the care of Dr. Essex Wynter in October, 1922. For two months he had had vague dyspeptic symptoms recently enhanced by shooting pains radiating towards the lumbar region some two hours after food. He had never vomited; the appetite was very poor; no tumour was palpable; he was somewhat pale and wasted.

The fractional gastric analysis is shown in Fig. 1, and at first sight suggests the picture of achylia gastrica, such as is seen in pernicious anaemia, chronic gastritis, etc. It differs from such a picture in the following essential particulars: the fasting stomach contained 15 c.cm. only, but there was a faint sour smell, traces of charcoal taken the previous evening were visible, as well as very definite amounts of blood, both fresh and "coffee-ground." The specimens removed from the stomach at one hour and one and a half hours also showed blood. No free HCl was discoverable at any time, but though the total acidity was low, that of the fasting content was 18, which is higher than is seen in benign achylia. These findings pointed clearly to a lesion producing some stagnation, though it could hardly be called partial obstruction, together with haemorrhage from the stomach, and diagnosis of carcinoma was made, which was fully confirmed by the subsequent history of the case.

FIG. 1.—Fractional gastric analysis, carcinoma ventriculi. The blood, charcoal, and relatively high total acidity of fasting content distinguish it from cases of benign achylia gastrica.

The Positive Diagnostic Picture.

My protest against current teaching would have very little value if more positive evidence were not obtainable; that such evidence is forthcoming has been shown in the cases cited and may be summarized in the following statement:

> If the patient be suitably prepared overnight, and if careful examination of the contents of the fasting stomach be made the following morning, evidence either of stagnation, or of haemorrhage with aberrant secretion, or of both, will be found in the vast majority of cases of gastric carcinoma, and these signs are not likely to be confused with those given by other diseases.

I have tried to express this in terms commonly used by clinicians, for much of the confusion existing on this subject is, I believe, due to results being stated in purely chemical terms. The biochemist is too often asked to make a report on a specimen removed from a patient whom he has never seen and of whose clinical state he is entirely ignorant; his reports in consequence tend to become technical statements written from a point of view very different from that of the clinician, and omitting data which are of small chemical importance but possibly of immense significance in a clinical inquiry. For example, reports of gastric analyses often contain the information that little or no free HCl was present, but much lactic or organic acid; the fact that this is evidence of stagnation, of bacillary fermentation above a partial obstruction, is not alluded to; the chemist is not always aware of the deduction, the clinician fails to make it.

Great harm has, I believe, been done by endeavours to interpret results of gastric analysis on empirical or on purely chemical grounds. I am not aware that anyone has yet been able to demonstrate any specific chemical substance secreted by readily accessible tumours such as malignant growths of the breast or tongue; certainly no such specific substance has been discovered in the blood, and yet one still encounters attempts to found diagnostic tests for cancer of the stomach on the presence of some unusual substance in the gastric contents being supposedly a product of the actual tumour. I would repeat my belief that these substances are effects of the tumour only in so far that gastric neoplasms produce partial or complete gastric obstructions.

The detection of early cancer of the stomach becomes possible if steps are taken to make stagnation easily demonstrable; this can be done by giving some finely divided charcoal in milk overnight—two teaspoonfuls in a tumbler of milk is sufficient, but it is perhaps well to give a charcoal biscuit in addition. The next step is to evacuate the fasting stomach content with great care; Rehfuss has shown that this can be done far more securely with one of the small modern tubes than with the large ones formerly employed.

In a total series of 53 cases in which the clinical diagnosis of gastric carcinoma was definitely made, charcoal was visible in the fasting content next morning in 30; but other signs of stagnation—a foul odour, lactic acid, and a relatively high concentration of acids other than hydrochloric—were present in 20 out of the remaining 23 cases. Blood was present, either fresh or partially broken up, in 35 cases.

A Summary of Proven Cases.

Under existing conditions it is difficult to secure accurate notes of the after-history of many hospital cases, and for this reason I am unable to describe all the cases referred to as proven cases of malignant disease. In 20 cases laparotomy, or a full history of the case, allows me to speak with certainty, and analysis of these is not without interest. They are divisible into three groups.

GROUP 1: *Cases with Pyloric Obstruction.*—Nine cases fall within this group: in 4 of them free HCl was present in the fasting stomach content as well as after the test meal, in 3 it was present only after the meal, and in 2 it was absent throughout. In all these cases the diagnosis was evident from the test meal; in 5 it was made independently by the radiographer; in 4 the *x*-ray report merely recorded gastric stasis or gastric atony. All were operated on, and it is significant that in 5 of the 9 gastrectomy was performed without difficulty and no metastases were visible. In 3 of these recurrence is known to have taken place; but it is, I think, worthy of close attention that in so large a number the surgeon was almost within reach of securing complete removal of the malignant tissue. The 4 cases in whom gastrectomy was not indicated were treated by gastro-enterostomy, with considerable immediate relief. A typical gastric analysis chart from a case in this group is shown in Fig. 2; it illustrates the relatively high total acidity compared with the low free HCl, the tendency to haemorrhage, and the marked delay in gastric emptying. All of these are characteristic of the group; haemorrhage is not infrequently absent, but the picture of partial obstruction is typical by itself.

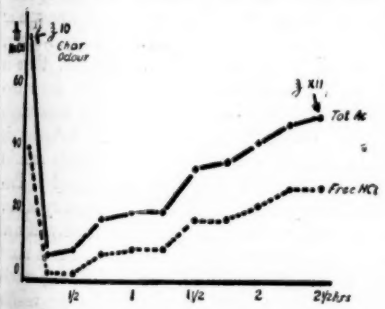

FIG. 2.—Fractional gastric analysis, carcinoma ventriculi. The high total acidity with charcoal in fasting content and the obvious obstruction leading to 12 ounces of the meal being still in stomach at two and a half hours, are characteristic.

GROUP 2: *Cases without Pyloric Obstruction but with Signs of some Stagnation.*—Nine cases fall in this group also; in 3 there was free HCl in the fasting stomach, in 1 it was only present after a meal, and in 5 there was complete achlorhydria. In none of them was there any delay in the emptying time after a meal, and in several the stomach emptied very rapidly. This may be due to several causes—in some cases there is an invasion of the pyloric region with neoplastic tissue which seems to prevent closure, in others the tumour in the body of the stomach appears to stimulate peristalsis and cause rapid emptying. The cases secreting HCl give a picture which is at first sight one of normal secretion—an example is given in Fig. 3, but it will be observed that here, too, there is a relatively high proportion of organic acid, as opposed to free HCl in the fasting stomach content, and this, together with its characteristic odour, traces of charcoal, and sometimes obvious blood, makes diagnosis easy. Cases with complete achlorhydria were similar to that illustrated in Fig. 1. This group differs from Group 1 in that surgical interference was seldom indicated. In the majority of cases a palpable tumour made it clear that the possibility of excision was remote. Only two were operated on; in at least two others marked temporary amelioration of symptoms was obtained by deep *x*-ray therapy.

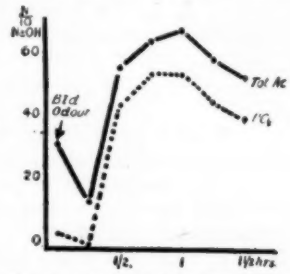

FIG. 3.—Fractional gastric analysis, carcinoma ventriculi. Fasting stomach content gives clear evidence of stagnation, even though later specimens show free secretion of HCl.

GROUP 3: *Cases whose Clinical Picture was one of Obscure Anaemia.*—Two examples of this well recognized type are included in the series. Both showed complete achlorhydria with rapid emptying. In both a foul-smelling "resting juice" with recent blood in it made the diagnosis apparent, and in both this was subsequently confirmed radiographically.

The cases I have detailed are selected only in so far that they are the proven ones amongst a much larger number; in some 30 others the diagnosis was clinically definite, but I have excluded them on account of their final history being unknown. As far as I know I have not seen a case of malignant disease of the stomach which did not give a positive diagnostic picture on gastric analysis, and the only condition with which this can be confused is that of gastric syphilis. In syphilis of the stomach there may be tumour formation with pyloric obstruction which is indistinguishable from cancer by any means save histological examination; the Wassermann reaction is positive in such cases, but we have at present no means of knowing whether this may not be a sign of old infection with concurrent malignant disease.

I have already commented on the fact that the incomplete descriptions of the textbooks do not necessarily represent the opinion of those with a special personal experience of gastric analysis. An example of the latter type of opinion may be found in the recent paper[1] by Donald Hunter; his findings agree substantially with my own, the less definite picture which he obtained being accounted for by the fact that he did not give charcoal before his examination, and did not perform such extensive gastric lavage in obstructed cases. A. F. Hurst has also, in recent communications, drawn attention to the relative frequency of free HCl in these cases when examined by the fractional method.

Gastric analysis should be regarded as a clinical and not as a laboratory procedure; if this were recognized, and if the observer would seek for the evidence I have outlined, the early diagnosis of cancer of the stomach would be enormously improved, and the percentage of operable cases notably increased.

In conclusion I would express my indebtedness to my colleagues at the Middlesex Hospital and its medical school for the facilities they have afforded me in this work. The expenses incurred in performing it have been partially defrayed by a Government grant made on the recommendation of the Royal Society.

REFERENCE.

1 Donald Hunter: *Quarterly Journal of Medicine*, 1923, xvi, 118.

SOME APPLICATIONS OF PHYSIOLOGY TO MEDICINE.

II.—VENTRICULAR FIBRILLATION AND SUDDEN DEATH.

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(*Concluded from page 219.*)

Sudden and Unexpected Death during Rest.

THE difficulty of explanation of such deaths has long been felt, in the absence of recognized conditions (effort and excitement) tending to make an extra call on the heart and of such powerful afferent excitation as might be assumed to be provocative of reflex inhibition of intensity and duration sufficient to be fatal. Recourse has constantly been had to the verdict of "failure of the heart's action," though the sudden collapse in cardiac efficiency remains unaccounted for, *post-mortem* examination often affording no explanation of the abrupt ending of life. Sir Clifford Allbutt,[27] while suggesting vagus inhibition as a mode of death during anginal attacks, writes with regard to the class of deaths now under consideration—during conditions of rest, apart from anginal attacks, and where no exciting cause is apparent:

> "But the riddle, which I have done so little to read, is the frequent suddenness of death in one who, having scarcely known illness, expires under no extraordinary effort; or in the peace of his own bed or chair passes silently away. The reading of this riddle is not yet."

In this relationship the facts that have been stated with regard to the more or less remote effects of experimental interference with the coronary blood supply by ligation of a branch are obviously of profound significance, showing as they do that ordinary life can go on for prolonged periods (months), either with or without signs of cardiac disturbance, until a sudden ending comes by fibrillation, sometimes during muscular effort, but often apart from this, in the absence of recognizable exciting cause or in presence of causes too trivial to have any effect under ordinary conditions. And, apart from sudden obstruction, there is no reason to doubt that a gradual interference with the blood supply as a result of coronary disease can, by damaging the nutrition and altering the properties of the muscle, lead to an abnormal susceptibility to fibrillation.

The applicability to man of these results is naturally easy in view of the widespread tendency to serious impoverishment of the blood supply (local or general) of the cardiac muscle in the later half of life, the period when deaths of the class under consideration usually occur. In the light of these facts we have a rational basis for many unexplained disasters—fatal events that otherwise remain shrouded in mystery.

While the effects of limitation of the blood supply are proved by abundant and convincing evidence, other agencies, such as perverted nutrition, toxic influences, generative changes, etc., can be effective causes. Interference with normal functioning of the Purkinje fibres on the inside of the ventricles comes into question as well as alterations in the ordinary myocardium. Fibrillation may be determined at a certain point of time by a sudden aggravation or cumulation of the toxic condition, etc., aided, it may be, by the incidence of some disturbance of the vascular system too slight to produce any serious effects except in the specially predisposed condition.

It is to be borne in mind that the conditions disposing to and leading up to fibrillation need not pervade the whole of the ventricular musculature, but may be limited to a certain amount of that tissue, as after obstruction of a coronary branch and in other conditions; changes in restricted areas can set up fibrillation, which involves the rest of the muscle, healthy as the great bulk of it may be. It is readily intelligible that such limited changes may naturally be associated with little or no recognizable alteration in the force of the ventricular beat or its general efficiency. Thus there may be little or no warning of the impending catastrophe, even at a time when the mine has been laid and only a spark is needed to precipitate the explosion.

Abnormal Cardio-vascular Variations of Obscure Origin.

Under certain conditions of cardio-vascular instability—usually occurring in association with morbid states of the arterial system—irregular tides of circulatory change, often obscure as regards their exciting causes, are sometimes recognizable; one manifestation of these is found in the extensive variations of arterial pressure as measured under similar conditions from day to day or at shorter intervals. These variations are sometimes, but not necessarily, associated with discrepancies in the sphygmomanometer readings from different limbs, depending on local causes—the presence or absence of strong contraction in the large arteries of the respective limbs. Actual rises of general arterial pressure involve cardiac changes in addition to vascular constriction, etc. It is evident that disturbances of this kind may be influential with regard to the onset of anginal attacks or of sudden death in subjects where a special predisposition exists.

The Question of Coronary Spasm.

With regard to sudden interference with coronary blood supply, apart from the rare accident of embolism and the less rare occurrence of thrombosis, there arises the question of spasmodic contraction—an old hypothesis as applied to the explanation of anginal attacks. The obscure cardio-vascular disturbances already referred to might be invoked to account for the onset of some anginal attacks during rest; the attack might be determined by antecedent unrecognized changes in blood pressure and heart action. But there are on record cases in which such attacks during a period of rest are found to be unattended by elevation of the blood pressure or recognizable changes in the heart's action. Again, there are instances among anginal subjects who have varying periods of relatively low and high pressures, where no greater tendency to angina has been found in the phases of high pressure; a notable example of this has been recorded by Sir James Mackenzie. In such cases the idea of coronary spasm has commended itself to many observers, supported by such analogies as the extreme arterial constriction of Raynaud's disease, the thickening and narrowing of the temporal artery on the same side as the pain in migraine and the occasional association of Raynaud's disease and migraine, the occurrence (sometimes in relatively youthful subjects) of transitory aphasias, hemiplegias, etc., attributed to an acute temporary anaemia or ischaemia from extreme constriction of a cerebral artery, and sometimes associated with migraine. Again, there is the so-called "abdominal angina," which has been correlated with spasmodic contraction of sclerosed mesenteric arteries. Sir William Osler,[28] referring to arteries in general, states that in a certain stage of sclerosis arteries are very prone to spasm—a view repeatedly urged by Professor W. Russell[29] and supported by Pal[30] and many others.

It is evident that a temporarily excessive contraction of some part of the coronary system (especially in cases where the blood supply is already reduced or minimal) would induce an ischaemic condition which might be responsible for the onset of fibrillation or of an anginal attack; in this way an apparently unprovoked paroxysm of pain during rest might be accounted for and also its equally unexplained passing off after variable periods. It might also be surmised that amyl nitrite may relax a constricted coronary as part of its general vascular effect, with relief of pain which may last after the general blood pressure has again risen to its former level. The spasm hypothesis has been subjected to searching criticism by Sir Clifford Allbutt, who among many other considerations states that amyl nitrite gives no relief in transitory hemiplegias and aphasias. There is also the occurrence of dyspnoea in coronary obstruction from sudden thrombosis or embolism (as established *post mortem*) and its absence as a necessary feature of typical angina; but a possible explanation of this difference can be suggested.

Evidence of the occasional presence of strong contraction of large arteries (brachial, etc.) in diseased conditions in man was obtained by the present writer, in conjunction with Professor G. Spencer Melvin[31] and Dr. J. E. Kesson,[32] in an investigation of blood pressure a number of years ago, and surviving sclerosed arteries from the legs of old horses were found to show extraordinarily intense contraction, causing complete obliteration of their lumen and an enormous resistance to attempts to force blood through them.

In relation to the question of arterial spasm, doubt as to the existence, at least in effective degree, of vasomotor innervation of the coronary arteries is not a consideration of decisive moment. For there is no proof that the forms of excessive contraction now under discussion—for example, in the brachial artery or the horse's leg, etc.—are vasomotor phenomena; it is more probable that they are directly dependent on morbid conditions present in the arterial muscle at the time.

It may be argued that the foregoing considerations point to the feasibility of the hypothesis of coronary spasm, in view of there being no sufficient reason to assume that the coronary vessels—specially prone as they are to sclerotic changes—should in diseased states be immune from such functional disturbances as seem to occur in other arteries. But the question is far from being closed.

Fatal and Non-Fatal Angina.

It is necessary to discriminate clearly between the separate questions of (1) the mechanism of pain production in anginal attacks, and (2) the mechanism of death occurring during or between attacks, sometimes without warning.

The striking tendency of the graver forms of angina to terminate in sudden death need not be emphasized. There is every reason to believe that, in many cases at least, the end comes by ventricular fibrillation, and that the different issue in fatal and non-fatal cases hangs on the supervention of fibrillation in the former and its absence in the latter. The development of fibrillation as a frequent and characteristic result of defective coronary blood supply, as demonstrated experimentally, has already been described; and we know, from abundant pathological evidence in man, the association of coronary and myocardial impairment with fatal angina. Further, the clinical features of many recorded anginal cases, where sudden death took place either in an attack of pain or apart from such, are very noteworthy in their similarity to those attendant on death by ventricular fibrillation. The significance of these facts taken together need not be enlarged upon.

If we accept the view, which has commended itself to many observers, that an important factor in the production of pain in angina is to be found in the heart muscle working with a defective blood supply, it becomes plain how increased demands on the organ by muscular effort or emotional stress may excite an attack by leading to a relative anaemia, the blood supply, which was sufficient during rest to ensure the absence of pain, now becoming inadequate for the muscle. Such a conception might be brought into relation with the results obtained in an ischaemic limb where, on working a muscle, acute pain is caused long before the fatigue point (as indicated by inability to raise the weight in ergograph experiments) is reached—a mechanism of pain production apparently different from that present in a muscle working to fatigue while its normal circulation is going on (MacWilliam and Webster[33]).

It may be conceived that in the close and striking association of angina and sudden death we see the working of distinct but related mechanisms, based in part at least on a common underlying process, essentially similar in character but differing in intensity and in the fatal or non-fatal issues, these issues being no doubt also influenced by other conditions which affect the results of the fundamental process. A conception of this kind would include two categories of dangerous anginal conditions—one with more or less transient attacks of pain of varying grades of severity, the other with the process, common to the two categories, going further in some directions, attaining greater intensity, and culminating in ventricular fibrillation. But the pros and cons of the vexed question of pain production in angina are beyond the scope of this paper.

In connexion with the well known fact that pronounced coronary sclerosis very frequently exists without angina, it has to be borne in mind that an essential point is, not the structural change in the arterial wall, but the amount of actual defect of blood supply through the sclerosed vessels from greater or less narrowing of their channels, the presence or absence of contraction in their muscular coats, the state of the capillary field, etc. Much depends no doubt on the more or less gradual development of obstructive change, the establishment of more or less efficient collateral circulation, etc. It is known that life may go on after the gradual development of complete occlusion of one coronary while the other may be found to be very greatly reduced in calibre; also after complete blocking of a large branch. Collateral circulation obviously plays an important part; it is now well known that the coronary branches are not end arteries, as was at one time believed, but have numerous anastomotic connexions. Further, as described by Gross,[34] the blood vessels (arteriae telae adiposae) of the subepicardial fat, which increases in amount as life advances, can in some measure exercise a compensating influence, supplying a considerable amount of blood to the subjacent muscle. Belonging to this system are delicate parallel vessels accompanying (at some distance) the main coronary branches, as well as a feltwork of vessels in the fat of the auriculoventricular groove. Gross emphasizes the importance of a relative anaemia of the muscular walls of the right heart in old age, as bearing on failure in pneumonia, etc.; he suggests a variation of the adage that a man is "as old as his arteries" to "as old as his right coronary artery."

It is noteworthy that when the main trunks and large branches of the coronaries are the seat of pronounced sclerotic changes the intramuscular twigs and finer ramifications may remain practically unaffected. The extent and efficiency of the capillary system are obviously of prime importance.

Syncope from Ventricular Standstill due to Heart-block.

In cases of heart-block, Adams-Stokes syndrome, etc., where death occurs suddenly, it is uncertain whether simple stoppage of the ventricular beat in the state of diastolic relaxation always lasts long enough to kill by paralysis of the nerve centres, following the phases of unconsciousness and convulsive phenomena. The time needed in man for irretrievable damage of these centres by acute anaemia is not known; in the ordinary experimental animals it is relatively long—a number of minutes. Of course, there may sometimes be morbid conditions present in man which would shorten the time that circulatory arrest can be survived. But in view of the associated structural damage present in the Adams-Stokes syndrome, the possibility of the ventricular standstill terminating in fibrillation in some instances must not be overlooked, though there seems to be at present no actual evidence of this happening in man. On the other hand, it is true that a fall of blood pressure, such as accompanies ventricular standstill, exercises a restraining influence on the development of fibrillation under certain conditions; but this does not always hold good under other conditions—for example, fibrillation sometimes develops in the gravely depressed or dying heart, notwithstanding the fact of excessively low blood pressure. In any case it must be concluded that only a fraction of cases of sudden death can possibly be attributed to ventricular standstill depending on the relatively rare condition of heart-block.

Syncope during Tachycardia.

There is strong reason to believe that the fibrillation mechanism is operative in many cases of sudden death associated with ventricular tachycardia. The myocardial conditions underlying tachycardia are closely related to those on which fibrillation is dependent, and there is abundant evidence that the former may develop into the latter. The excessive rate of beat—whatever be the origin of the tachycardia—is in itself favourable to this development, since it involves shortening of the refractory period and lengthening of the conduction time. The rapidity of succession of contractions—whether arising in the ventricles

themselves or transmitted with abnormal frequency from the auricles as in auricular flutter—that the ventricles can stand without fibrillating varies much in different conditions; when the conductivity is already depressed and the conduction time long, a much lower grade of acceleration naturally suffices to establish fibrillation, as can be demonstrated experimentally.

From the work of many observers we know that in certain hearts (for instance, after coronary ligation, etc.) there is often a characteristic sequence of events illustrative of the close relations of tachycardia and fibrillation—extra-systoles, first singly, then in irregular runs, more or less continuous tachycardia, and finally fibrillation. Apart from the supervention of fibrillation it is known that the fall of blood pressure attendant on tachycardia is compatible with life for very considerable periods; there have been recoveries after periods of excessively low blood pressure attended by unconsciousness, etc., for hours. It remains to be seen whether the fall of blood pressure is often or ever sufficient *per se* to kill, or whether the fatal issue is always determined by the occurrence of fibrillation. There are no grounds for accepting vagus inhibition as a mode of sudden death during tachycardia. The vagus is known to lose effectiveness in this condition. Auricular flutter, etc., may induce unconsciousness lasting for hours without causing death; a very small blood supply can suffice to keep the nerve centres alive, as Leonard Hill showed many years ago. The absence of fibrillation is an essential feature in the recovery from ordinary cases of fainting due to temporary vascular relaxation due to vasomotor failure or to vagal inhibition, etc.

Status Lymphaticus, Electrical Shock, Digitalis.

A possible development of the mechanism of fibrillation is worthy of consideration in connexion with the sudden and unexplained deaths of the status lymphaticus, occurring, as they often do, in the absence of any recognized causation. The features of some recorded examples would fit in with the known phenomena of fibrillation—for example, such cases as have shown an abrupt abolition of the signs of heart action while the respiratory movements persisted for some little time, in marked contrast to the order of events in death by asphyxia.

Fibrillation is one of the modes of death in electrical shock, and according to Jex-Blake[35] it is operative in death from lightning. There is convincing evidence—experimental and clinical—that the same mechanism is responsible for sudden death during overdosing with bodies of the digitalis series.

Sudden Death in Aortic Regurgitation.

The frequency of absolutely sudden death in this condition has long been recognized. In view of the usual coronary and myocardial involvements, the causation of the fatal issue—sometimes occurring without antecedent signs of cardiac failure—may naturally be ascribed to ventricular fibrillation. There seem to be no good grounds for the assumption of protracted vagus inhibition as an effective cause.

Reflex Cardiac Inhibition.

Reflex vagus inhibition has in the past been freely invoked to account for sudden death in many diseased conditions and even in healthy persons—for example, from a violent blow on the epigastrium, etc. On the experimental side extended investigations on a great number of healthy animals and a considerable number of diseased ones have failed to lend support to the hypothesis; it has usually been found impossible to stop the heart long enough to kill by reflex inhibition or even by strong direct stimulation of the vagus, escape of the heart or the ventricles usually occurring much too soon for death to be caused by circulatory arrest. The conclusion has been reached by different observers that the possibilities of a fatal issue in this way have, to say the least, been greatly exaggerated, and that there is no sufficient ground for assuming reflex inhibition *per se* to be a frequent or important mode of death.* In some instances where the vagal hypothesis had met with a large measure of acceptance—for example, in cases of sudden death during an early phase of ordinary chloroform anaesthesia—the view has not proved to be tenable, since such deaths have been shown to be essentially due to an altogether different mechanism—ventricular fibrillation.

On the other hand, the possibility of increased susceptibility to vagus inhibition under certain abnormal conditions must be borne in mind. In Embley's[36] work on chloroform it was found that under special conditions, in dogs after a large dose of morphine, the inhalation of strong chloroform vapour may cause great slowing of the heart, fall of blood pressure, and stoppage of respiration—consequences evidently depending on excessive vagus action, and obviated or removed by exclusion of such action by section of the vagi or by atropine. But the conditions present in these experiments differ widely from those of simple chloroform anaesthesia as ordinarily conducted in man. It is well known that in dogs morphine tends to exaggerate the controlling influence exercised by the vagus centre over the heart.

In Laslett's[37] well known case it was clear that vagus inhibition induced repeated syncopic attacks, causing cardiac standstill of the whole heart, sometimes lasting for periods of six to eight seconds, but not long enough to cause death; atropine was found to be effective as a counteracting agent.

In this connexion certain observations by Sir Hugh Anderson, cited by Sir Clifford Allbutt,[38] are very noteworthy. These were on cats in which the cardiac augmentor nerves were cut, by the stellate ganglia being excised some time previously. It was found that swinging the animal in the air caused pronounced slowing of the heart—for example, from 120 down to 40 in the case of *old* cats.* (It may be remarked that such degrees of slowing were not at all dangerous, and probably did not even cause much lowering of the systolic blood pressure.) But a remarkable tendency to sudden death was observed in these animals. No evidence is stated to show whether such deaths were actually due to extraordinarily prolonged cardiac standstill, or to the supervention of some other change—for example, ventricular fibrillation, to which cats are known to be specially prone under various conditions. So far as the available evidence goes, there is nothing to indicate that the observed slowing was more threatening to life than similar slowing as seen often in common cases of non-fatal syncope in man.

With reference to possible applications of indications afforded by such experiments to the human subject it has to be remarked that we know of no clinical condition in man where there is reason to believe that conditions at all resembling those stated above are ever present—consequences of an interruption of the various paths that traverse the stellate ganglia, loss of the nerve cells contained in them, etc.† Experimental investigation shows that the cardiac augmentor nerves are very persistent in their action, extremely resistant against drugs and various abnormal conditions, and demonstrably capable of strikingly effective action in many gravely depressed states of the cardiac muscle—in contrast to the vagus functions, which are well known to be readily diminished or cut out altogether by various chemical agencies, etc.

In many cases of common syncope vagus slowing of the heart down to 50, 40, etc., a minute is a feature, but such slowing is wholly insufficient to account for the fall of blood pressure and the loss of consciousness; there are other factors concerned. Such cases do not have a fatal issue. Some instances of this condition were described by Lewis[39] a few years ago in subjects of "irritable heart." Pretty extensive cardiac slowing is quite compatible with a fairly

* Sudden death during operative procedures in the thoracic cavity (thoracocentesis, etc.) seems, in the light of the work of Capps and D. D. Lewis, to depend on fall of blood pressure due to vasomotor changes rather than to reflex cardiac inhibition (*Arch. of Int. Medicine*, 1907, cxxxiv, 868).

* Sir Clifford Allbutt predicated an increased potency of the vagus in old and damaged hearts. Gilbert (*Arch. of Int. Med.*, 1923, xxxi, 423) has recently found in old people a more ready response of the vagus to digital compression—an age effect, apart from pathological cause. The mechanism of digital pressure is undecided—whether it acts directly by stimulation of efferent (inhibitory) fibres or reflexly by excitation of afferent fibres. There seems to be no proof of actual danger to life in this way.

† Jonnesco's operation for angina pectoris is an example, resection of the lower cervical and the first thoracic sympathetic ganglion being done with the object of interrupting afferent paths from the heart. Jonnesco recommends the bilateral operation, regarding it as harmless; he does not seem to have recognized any such dangers as were noted in Anderson's experiments. (Jonnesco, *Bull. de l'Acad. de Méd.*, Paris, 1920, lxxx, 93; *Presse Méd.*, 1921, xxix, 193; Ibid., 1922, xxx, 353.)

good blood pressure—vastly higher than what is necessary for the continuance of life. Pronounced slowing (without danger to life as a rule) is, of course, familiar in some forms of violent pain—for example, in biliary and renal colic, etc.

The conditions under which sudden death most commonly occurs—namely, muscular exertion—are not favourable to prolonged vagus inhibition, but on the contrary are associated with reduction of the normal vagus control over the heart and concomitant activity of the augmentor nerves, leading to acceleration with increased force of the beats, etc.—conditions favouring the development of fibrillation in predisposed subjects. The same holds good generally in emotional excitement, apart from the very brief standstill (or prolongation of diastole) which may be caused by sudden fright.

Vagus Inhibition succeeded by Fibrillation.

There is another possibility with reference to the effects of vagal inhibition. Experiment has shown that attacks of auricular fibrillation of varying duration sometimes develop after a period of inhibition, sometimes after one or more recommencing auricular beats have occurred. The development of fibrillation in these instances is definitely related to the occurrence of the preceding phase of inhibition induced by vagus stimulation.

Fibrillation of the ventricles has also been seen following vagus standstill, but this is a rare phenomenon as compared with the development of auricular fibrillation in similar circumstances. In the course of researches over a great many years I have obtained records of only a very few examples. Still these are enough to indicate that, in presence of undue ventricular susceptibility, fibrillation may sometimes be determined in this way in some of the manifold varieties of abnormal conditions that can occur in man. Thus vagus inhibition, much too brief to be dangerous through the standstill induced, may possibly involve a mortal issue through a succeeding fibrillation.

Fibrillation or Reflex Inhibition in Sudden Death in Anginal Subjects.

The following considerations may be cited in favour of the fibrillation view of death in angina.

1. The presence of coronary and myocardial conditions which are known in certain circumstances to predispose to fibrillation. The invariable or almost invariable occurrence of coronary lesions in cases of *fatal* angina is a matter of general agreement. Sir Clifford Allbutt has adduced a wealth of facts and considerations marshalled with his usual skill, in favour of his view of the aortic origin—as contrasted with coronary and myocardial origin—of anginal *pain*. But this veteran clinician at the same time recognizes that the question of a *fatal issue* to an anginal attack is essentially associated with the condition of the myocardium.

2. The recognition by numerous observers, in some anginal attacks, of acceleration of the heart's action with irregularities, extra-systoles, etc.; such are known in many conditions to herald the onset of fibrillation. Among others, Windle recorded a fatal attack of angina in which the heart rate rose from 75 to 150 and became very irregular.

3. Though some slight slowing of the heart may occur in an anginal attack, there seems to be no direct evidence of the occurrence of pronounced inhibition, such as might, if somewhat intensified, threaten a suddenly fatal issue; the degrees of inhibitory slowing observed have been far removed from determining circulatory failure or even causing any considerable fall of blood pressure. There seems to be no relation between the severity and duration of the pain and the tendency to die in the paroxysm.

4. Death often occurring at the beginning of an anginal attack or in one that is relatively slight as regards pain, etc., is probably of the same mechanism as absolutely sudden death occurring between attacks or in persons who are not subjects of angina; the considerations bearing on such deaths are probably applicable to deaths *during* anginal attacks.

5. In the case of death between attacks or during relatively slight pain there is no evidence of such powerful afferent excitation as might be supposed to produce cardiac inhibition of such intensity and duration as to be fatal.

Of course it would be rash to dogmatize at the present time on an exclusive application of one mechanism as being the only one operative in all instances of anginal death; it may be that one or other form is present under different conditions. But there is a strong case for fibrillation as a common mode of death in anginal subjects, whatever the precise mechanism of *pain* production in angina may be.

Conclusions as to Sudden and Unexpected Death of Cardiac Origin.

Rupture of the heart is a very rare accident. Simple standstill of the ventricles in complete heart-block can only be a rare cause—assuming that such standstill may sometimes kill without fibrillation as the terminal event. As has been stated, it is open to grave doubt whether reflex vagal inhibition *per se*—that is, without the supervention of fibrillation—is responsible for many deaths. Blocking of the mitral orifice by a thrombus and embolism of the pulmonary artery are known to be of very rare occurrence. (Thrombosis and embolism of the coronary arteries kill, as has been already stated, by fibrillation.)

The old idea of a heart that is working with fair efficiency abruptly "failing to contract" against excessive resistance may be set aside as untenable, in the absence of the sudden action of violent poisons, etc.

There remains the conclusion that the great majority of absolutely sudden deaths are to be ascribed to ventricular fibrillation.

Symptoms of Ventricular Fibrillation in Man and Animals.

The similarity between the group of symptoms associated with many cases of sudden death in man and those attendant on ventricular fibrillation experimentally induced in animals is indeed striking. The abrupt abolition of pulse, cardiac impulse, and heart sounds, the sudden fall of blood pressure, unconsciousness, muscular relaxation often preceded by a brief phase of rigidity or convulsive movement, dilatation of the pupils, and the continuance of slow deep respiratory movements, are identical in animals and in the human subject, while in the latter the speedy replacement of the initial intense pallor by lividity or marked cyanosis is a notable feature. The amount of colour in the face, together with the occurrence of several respirations after the collapse, have sometimes made onlookers somewhat incredulous that death has taken place. The occurrence in some cases of premonitory features such as extra-systolic irregularities, bouts of tachycardia, etc., is significant. It is important that, in the collection of evidence as to unexpected and unexplained death, special attention should be devoted to ascertaining the occurrence of the group of associated features just stated; these have been very definitely recognized in many cases of sudden death where accurate observations have been made. Some such cases have come under the direct observation of the writer.

No doubt some of these phenomena are common to certain other forms of sudden circulatory failure—for example, from heart-block, collapse induced by violent afferent impulses (blow on epigastrium, etc.), or in certain cases of auricular flutter, etc. But there are special features in some of these—for instance, as regards the behaviour of the respiratory centre, etc.

Protective and Remedial Agencies.

In animal experimentation—on cats, which are remarkably liable to ventricular fibrillation—the use of certain drugs has been found by the present writer[40] (working in conjunction with Professor Spencer Melvin and Dr. J. R. Murray) to have decidedly beneficial effects, both in the way of protection against the onset of persistent fibrillation (for example, against faradic currents one hundred times as strong as are usually effective) and—in combination with cardiac massage—as regards recovery from the actual attack. These methods are at present only applicable under experimental conditions. But they give some ground for hope that, with fuller knowledge of the conditions that influence the inception and persistence of fibrillation, much may be possible in the future as regards the warding off of such catastrophic happenings as often bring life to an unexpected

and sudden close from failure of cardiac function, occurring often in persons whose hearts are far from being worn out, but on the contrary are endowed with myocardial power amply sufficient not only for quiet existence but not infrequently for the demands of considerable bodily and mental activity.

There is reason to believe that in man, as in animals, an undue susceptibility to fibrillation is sometimes a temporary phenomenon depending on circumstances that may be more or less markedly transitory, though no doubt it is very often a persistent condition depending on abnormal changes in the ventricular musculature; in the latter case immunity from sudden death must in large measure depend on avoidance of the directly provocative causes of fibrillation in a predisposed heart, such as sudden muscular exertion, especially when accompanied by emotional stress, etc.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

AN UNUSUAL VARIETY OF "SORE THROAT."

CASES are frequently met with in which sensations of pain or discomfort in the pharynx are complained of but no cause can be found on physical examination. It has long been recognized that the styloid process may project into the tonsil even to such an extent as to form a projection in the lateral wall of the pharynx. This elongation is probably due to ossification extending down the stylo-hyoid ligament, but has been regarded as an anatomical curiosity rather than as of clinical importance. I have recently met with two cases in which this condition gave rise to symptoms which were entirely relieved by removal of a portion of the bony process.

A woman, aged 30, had for two weeks suffered discomfort and dragging sensation in the left side of the throat, especially on swallowing. There had been no previous throat symptoms. An ill defined projection of the lower pole of the left tonsil could be seen, and the patient had herself discovered this hard "knob" with her finger, and ascribed her sensations to this situation. Under a general anaesthetic an incision was made through the anterior pillar of the fauces, the bony process freed, and three-quarters of an inch removed with bone forceps. The wound was sutured and recovery uneventful.

A woman, aged 37, had had pain in the left side of the throat for three months. On examination a similar condition was found to that existing in the previous case, and here also the patient had herself discovered the hard swelling. A similar operation was performed, during which it was found that the styloid process on the right side was also elongated and palpable, but to a less degree. This was not interfered with.

In addition to these two cases, I have collected eight others from the literature. Of the total of 10 cases, 7 were females, only 3 males. The ages ranged from 23 to 55. In 7 of the cases the left side was involved, and in 2 an elongated process could be felt on both sides, but only gave rise to symptoms on one. The period during which symptoms had been noticed varied from a fortnight to ten years, with an average of three years. In all cases the symptoms were very similar, consisting of discomfort and dragging sensation in one side of the throat, most marked on swallowing and sometimes on talking. In some of the cases there was a history of previous attacks of tonsillitis. Trauma as a possible factor was present in one case, symptoms being first noticed after a violent blow on the head. Nine of the 10 cases were submitted to operation, with relief of symptoms in every case. In some of the cases the tonsil was removed in addition to the portion of the styloid process, but the results seem to have been equally good where this was not done.

Details of the various cases are given in the *Journal of Laryngology*, 1915, pp. 116, 176, and 303; the *Laryngoscope*, November, 1915, November, 1918, and May, 1920; and in the *Journal of Ophthalmology, Otology, and Laryngology*, May, 1917.

Bristol. A. J. WRIGHT, M.B., F.R.C.S.

THE CAUSE OF "STITCH."

"STITCH" is a very common condition among adolescents; it is a very severe pain, felt generally at the costal margin on one side; it is brought on by running or riding, and ceases at once when the pace is reduced to a walk. There is another "stitch," which is felt above the clavicle on one side, in the same circumstances; this is much less common than the subcostal type.

There are two possible causes for "stitch": stretching of pleural or peritoneal adhesions, or interference with the action of the diaphragm by gas in the stomach or colon. The condition seems to me to be too frequently met with to be due to pleural adhesions, since these are not very common in young subjects.

I recently saw a boy, aged 12, who, when he ran, always got "stitch," generally below the left costal margin; he had become so much worse that he had lately been compelled to sit down after walking a few hundred yards. He had had tuberculous glands in the neck, so that the existence of pleural adhesions was quite a reasonable assumption in his case; but I was struck by finding extreme tympany in the splenic region. He was habitually constipated, as many boys of his age are. Thinking that the gas was probably in the splenic flexure I gave him a short course of grey powder, and a prolonged course of dimol. In three days he was able to walk and run without any suspicion of "stitch"—a thing he had never been able to do before. But he gets recurrences if he leaves off the dimol for more than a few days.

Westgate-on-Sea. FREWEN MOOR, M.D.

ACTINOMYCOSIS OF THE RIGHT ILIAC FOSSA.

THE case here reported is of interest, not only owing to its rarity, but also because it demonstrates how few symptoms may be present in such cases.

A boy, aged 12, was admitted to the Southend Victoria Hospital at the end of March with a large swelling in the right iliac fossa. He stated that a week previously he had been kicked in this region whilst playing football. Three days later he noticed a swelling, which later on became tender. He felt unwell. There had been no vomiting nor acute pain. He was not constipated. The boy was pale, thin, and looked ill; the temperature was 99.4°, and the pulse 94. There was a large fluctuant, tender swelling in the right iliac region, and the diagnosis of an abscess resulting from infection of a haematoma of the anterior abdominal wall was made. The abscess was incised and packed with flavine gauze; during the next month it healed, leaving a small sinus. The boy put on weight rapidly; the temperature, however, remained persistently high (103° at night, 99° in the morning) and was not affected by vaccine therapy.

Mr. Maingot found that a probe could be passed down the sinus into the right iliac fossa; its passage was followed by escape of offensive pus showing typical sulphur granules, which microscopically proved to be actinomyces. For the next month intensive treatment with potassium iodide was employed; the sinuses were also excised. The temperature was quite unaffected, however, and after a month it was again considered advisable to explore the right iliac fossa, as the condition of the boy had become very serious. At the time of operation a hard mass was found in the right iliac fossa, but there was no evidence of the pus having tracked towards the kidney or diaphragm. The boy unfortunately was in such a weak condition that he died under the anaesthetic. No *post-mortem* examination could be made. It is of interest that the temperature was not affected by potassium iodide; this was possibly due to a secondary infection being present.

I am indebted to Dr. Cleveland Smith for permission to publish this case.

ROBERT R. FOOTE, M.R.C.S., L.R.C.P.Lond.

Southend-on-Sea.

Reviews.

MAGIC AND MEDICINE.

As readers of fiction are well aware, a chance encounter at a wayside inn is often the prelude to an exciting romance. If rumour speaks the truth, as in this case we believe she does, it was just such a chance encounter which led to the Mackie Ethnological Expedition and to the publication of these harvests of facts which Canon Roscoe gleaned all alone in the heart of Africa and which are now being issued by the Cambridge Press. We do not know the inn nor the month of the year, but we do know that the great war was raging when the author of the *Golden Bough* sat down to an evening meal and that the stranger who sat by him was Sir Peter Mackie of Glenreasdell. As conversation proceeded, Sir Peter soon guessed that his neighbour was none other than the modest but industrious student who, seeking for an explanation of the strange behaviour which legend ascribed to the ancient Italian King of the Woods, had threaded his way to a great discovery—the discovery that, at a certain stage of evolution, the conduct of even the highest races of mankind was regulated by magic. As the conversation went on Sir Peter Mackie's sympathy became enlisted in a very practical way. He learned that there still survive in many parts of the world communities and kingdoms which are swayed and governed by the rules of magic, and that in a few years these ancient survivals will pass beyond recall. Had not Dr. Charles Seligman found among the Shilluks of the White Nile just that magic rule of priest-kings which the author of the *Golden Bough* had been led to postulate? What, then, might not be found amongst the peoples at the source of the Nile—in Western Uganda? There might survive there beliefs and customs which would throw a flood of light on the civilization of Ancient Egypt.

The art of gaining the confidence of a native people and of eliciting their secret beliefs and customs needs not only an inborn tact but a prolonged apprenticeship. John Roscoe, who for ten years had been rector of a country parish in Norfolk, had all these qualifications. As a missionary he had spent twenty-five years of his earlier life in Uganda, teaching the natives the ways of Christians and studying closely the beliefs and customs which had hitherto regulated their conduct. He found that the *Golden Bough* served him in all his inquiries as a most reliable guide and textbook. And so it came about, as a result of this after-dinner conversation, that Sir Peter Mackie placed a sum at the disposal of the Royal Society, and in the summer of 1919 the rector of Ovington signed on as a supernumerary sailor on board the *Clan MacArthur* and set sail for Central Africa. We do not believe that money was ever better spent, in the furtherance of knowledge, than was Sir Peter Mackie's bounty.

For over a year Canon Roscoe sojourned amongst the western tribes of Uganda, and the two volumes now issued by the Cambridge Press contain part of his harvest.

The first volume[1] deals with the dominant people of the province of Bunyoro, the second[2] with the chief tribe of the province of Ankole. In both cases these ruling peoples are a pastoral folk, dark as negroes in colouring but with features tending to the Egyptian type. They pasture their herds in countries occupied by true negro tribes, who cultivate the land. Amongst these dominant pastoral people our author found all the customs which mark the magic rule of priest-kings. One infers that the codes of belief and of conduct, which are now dying out in Uganda, may very well be survivals from the ceremonials and customs which prevailed amongst the founders of the civilization of ancient Egypt.

Medical men will turn to Canon Roscoe's pages for light on the ancient history of their own profession. They will find that the early practice of medicine was founded on a knowledge of magic; more especially was it based upon an intimate acquaintance with the nature and ways of ghosts. The medicine man in Uganda has to know how to distinguish between the illness caused by a friendly ghost and that caused by one of a malevolent nature, for in the one case the cause of the illness has to be coaxed out of the patient; in the other it has to be driven out. A medical man in Uganda has to be practised in all the arts of divination and augury, and if we are to judge of the correctness of treatment by the results which follow its application, our contemporaries in Uganda can claim long lists of successful cases. Even in England the belief in magical cures is by no means dead—at least in a section of the English public.

A belief in magic does not prevent the medicine man of Central Africa from applying means which we of the West regard as rational. He applies splints to fractured limbs in the same manner as did the ancient Egyptians; he cauterizes purulent open wounds with a red-hot iron; he removes foreign bodies, he applies pressure to stop bleeding, he cups, blisters, purges, gives emetics, and has a wide knowledge of abortifacients. He demands his fee in advance, for he knows that the death of his patient wipes out his account.

Particularly interesting are the observations here published relating to the methods of helping the mother when she is in labour. After the child is born the mother leaves the husband for three years, suckling her child for this length of time. At the age of 9 every girl amongst these pastoral tribes is secluded and embarks upon a process of fattening—for the value of a bride depends on the response her body makes to this treatment. Herein we get light on a matter which has puzzled students of early man. In many parts of Europe there have been discovered ancient figures of very fat women, and most of these figures have been made by peoples living in Europe during the later phases of the ice period. We may legitimately infer that these ancient ancestors of ours, like some of the modern tribes of Central Africa, had a weakness for fat brides.

No praise is too high for the author of these volumes. He sacrificed his ease and risked his health and life to save from extinction a large and valuable fragment of human experience.

ARTHUR KEITH.

[1] *The Bakitara or Banyoro. The first part of the Report of the Mackie Ethnological Expedition to Central Africa.* By John Roscoe, M.A., Honorary Canon of Norwich and Rector of Ovington, Norfolk, formerly of the Church Missionary Society. London: Cambridge University Press. 1923. (Demy 8vo, pp. xvi+370; 42 plates, map and plan. 25s. net.)

[2] *The Banyankole.* The second part of the above report. (Pp. xii+176; 31 plates and map. 15s. net.)

DIAGNOSIS OF GASTRIC DISEASE.

DR. WALTER ZWEIG'S textbook of diseases of the stomach and intestines, which has reached the third edition,[3] is written for practitioners, and accordingly much space has been allotted to diagnosis and treatment. The special part of the work, dealing with individual diseases, is preceded by a general consideration of the physiology of digestion, and the methods of diagnosis and treatment. Such matters are discussed as the analysis of the stomach contents and faeces, the radiography of the stomach and intestines, special physical therapy, such as massage, and the use of drugs and kindred subjects. There is a useful chapter on drugs, in which their mode of action and rational application are explained at greater length than is usual in textbooks. The special part of the work deals with the several diseases under the usual subheadings of etiology, symptomatology, and treatment. The author denies the existence of a clinical hyperacidity, while recognizing a chemical hyperacidity caused by hypersecretion or related to chronic ulcer. Many cases of chemical hyperacidity are met with in which symptoms are absent, and in those cases where symptoms are present they may, he says, often be relieved without any concomitant diminution in the hyperacidity. It is stated that haemorrhage in acute gastric ulcer is arrested in 93 to 97 per cent. of the cases within twenty-four hours on adopting the usual methods of absolute rest and abstention from food. If these measures fail, various haemostatics are recommended, special mention being made of a 5 to 10 per cent. solution of gelatin to produce thrombosis in

[3] *Lehrbuch der Magen- und Darmkrankheiten.* By Dr. Walter Zweig. Berlin: Urban and Schwarzenberg. 1923. (Sup. roy. 8vo, pp. xiii + 591: 81 figures, 4 coloured plates.)

the smaller vessels. In the author's experience gastro-enterostomy in the treatment of chronic gastric ulcer gives unsatisfactory results in more than half the cases and compares unfavourably with resection except as regards primary mortality (1.7 to 3 per cent. as compared with 5.6 per cent.). Recurrence of the ulcer is sometimes observed after transverse resection of the stomach, but can, according to Haberer, be avoided by including the pylorus in the excision; in fifty cases treated in this way he had no deaths and the results were good. The primary mortality in resection of the stomach for carcinoma is given as about 20 per cent., and in the majority of cases recurrence, it is said, takes place within two years of the operation. Leriche records freedom from recurrence for three years in 20.8 per cent., Mayr for five years in 25 per cent., and Kocher reported cases of cure after seven, eleven, and sixteen years. The results of resection for carcinoma of the intestine show, in almost all statistics, a mortality of nearly 50 per cent. A considerable number of favourable cases have, however, been recorded. Küttner in 800 cases performed the radical operation in 32 per cent. Of these, 32.5 per cent. lived over three years, 21.6 per cent. over five years, 16.4 per cent. over eight years, and 12.8 per cent. over ten years. In forty-seven cases treated by entero-anastomosis Schloffer had a mortality of 30 per cent. and the duration of life after operation averaged three years. The mortality after excision of the rectum for carcinoma has greatly diminished in recent years, and is now between 5 and 10 per cent. Pichler reckons that the average duration of life after operation is about two and a half years, but in 440 cases operated on by Czerny and Hochenegg, 31 cases lived for over ten years. The author's statistics seem all to be drawn from German sources.

SCHINDLER'S textbook and atlas of gastroscopy[4] is a handy and practical volume, the subject matter of which is well arranged and the text concisely written. The atlas consists of 20 coloured plates illustrating 119 gastroscopic observations, and exhibiting the lesions in their several varieties and stages. Thus chronic ulcer is illustrated in figures showing a callous ulcer of the small curvature, the same ulcer showing the apparent alteration in size due to altered position of the gastroscope, hour-glass stomach with a chronic ulcer at the narrowed portion, cicatricial contraction of the mucous membrane, and a healed ulcer. In addition to the normal stomach the following conditions are also represented: spasm, circulatory changes, acute ulcer, the various forms of gastritis, myoma, carcinoma, sarcoma, and gastro-enterostomy. In the text the various forms of gastroscope and their relative merits are discussed. The author speaks strongly in favour of the rigid instrument, and considers that the use of the flexible gastroscope is not free from danger. The central point of interest in gastroscopy is the degree of accessibility of the pylorus to observation; this is discussed at length, and the difficulties of the problem and the best means of overcoming them illustrated in a series of diagrams. A careful description is given of the mode of introduction of the instrument into the stomach, and the contraindications to its use. In a discussion of the difficult subject of orientation within the stomach, the principles that should guide the observer are formulated and twenty-two diagrams given to assist in mapping out the interior of the organ. In the pathological section the several diseases are treated of systematically. A general description is given of each disease, its etiology and symptoms, followed by a detailed description of the gastroscopic picture characterizing it. This is followed by notes of actual cases with the gastroscopic findings as illustrated in the plates. This section has been purposely added by the author in order to render the book of interest to a wider circle than that of the specialist in gastroscopy. At the same time the author gives a warning that gastroscopy is a difficult method and safely adopted in skilled hands only. The author expresses the opinion that if a patient of over 35 years of age is not relieved of gastric symptoms by four to six weeks of general treatment, or shows rapid wasting which cannot be referred to any definite cause, the gastroscope should be used. In this way carcinoma may at times be diagnosed before it can be detected by other means, including x rays.

[4] *Lehrbuch und Atlas der Gastroskopie* Von Dr. med. Rudolf Schindler. Munich: J. F. Lehmann. 1923. (Roy. 8vo, pp. viii + 132; 45 figures, 20 plates.)

GARROD'S "INBORN ERRORS OF METABOLISM."

IN 1909 Sir ARCHIBALD GARROD published his Croonian Lectures at the Royal College of Physicians of London for the previous year, under the attractive title of *Inborn Errors of Metabolism*, a phrase which has now deservedly passed into medical parlance. After an interval of fourteen years we heartily welcome a second instalment[5] of this work, which in a rather unusual degree combines both learning and fascination, and is what would be expected from the present Regius Professor of Medicine at Oxford. The word instalment rather than second edition is used advisedly, for not only has there been extensive revision and addition to the accounts given of the four conditions—albinism, alcaptonuria, cystinuria, and pentosuria—discussed in 1909, but two new forms—haematoporphyria congenita and congenital steatorrhoea—both of which have been fully brought to notice by his previous papers, are considered.

Of congenital steatorrhoea there are at present only three known cases, the first of which was described in 1911 by the author, who, though he gives the credit for the recognition of haematoporphyria congenita to Hans Günther, began his own well known work on haematoporphyrin more than thirty years ago. With the possible exception of cystinuria the most serious inborn error of metabolism is haematoporphyria congenita, but it is very rare, only eighteen cases being recorded. This pigment greatly exaggerates the sensitiveness of the tissues to light, so that the exposed parts of the body are prone to show a disfiguring hydrea vacciniforme, the attacks recurring with the advent of summer and leading to permanent scarring and even to blindness; the bones become deeply pigmented, and the author's patient had pink teeth. The article on this subject deals exhaustively with the chemistry of the porphyrins, and, indeed, is a condensed monograph. Of pentosuria, the least conspicuous and clearly defined of the six anomalies, less is now certainly known than was supposed in 1911, for points that then seemed to be decided once and for all have now become debatable, and it is possible that several distinct errors of metabolism are included under this heading.

That there are other inborn errors of metabolism to be established is probable, and indeed reference is made to a few possible examples, such as the very rare xanthin calculi described by Alexander Marcet more than a hundred years ago. The two introductory chapters on the chemistry of the species and of the individual and on the incidence and heredity of the inborn errors, in which the application of the Mendelian principles is discussed, contain much interesting matter. The work, dedicated to Professor Gowland Hopkins, "A Friend of Many Years," represents the high-water mark of scientific medicine.

[5] *Inborn Errors of Metabolism.* By Archibald E. Garrod, K.C.M.G., D.M., LL.D., F.R.S., F.R.C.P., Regius Professor of Medicine in the University of Oxford. Second edition. Oxford Medical Publications. London: Henry Frowde, and Hodder and Stoughton. 1923. (Cr. 8vo, pp. 216. 7s. 6d. net.)

SURGICAL DISEASES.

THE *Pathological Physiology of Surgical Diseases*,[6] translated by Dr. STANLEY REIMANN from the German of Professor ROST of Heidelberg, is intended to supply the need for an exposition of surgical questions from a somewhat generalized pathological point of view, as is done, more or less routinely, in internal medicine. It makes no attempt to indicate the practical technique of surgery, but is devoted to a discussion of the principles underlying diagnosis as well as operative methods. As a guide to the proper surgical measures to be applied in a given case, it aims at presenting the physiological effects of surgery, and explain Nature's method of compensating the effects of surgical intervention. It is often difficult to obtain information on pathological-physiological questions connected with surgery, since the literature

[6] *The Pathological Physiology of Surgical Diseases.* By Prof. Dr. F. Rost. Translated by S. P. Reimann, M.D., with a foreword by J. B. Deaver, M.D., LL.D., Sc.D., F.A.C.S. Philadelphia: P. Blakiston's Son and Co. 1923. (Roy. 8vo, pp. xiv+535. 6 dollars.)

containing this material is scattered through numerous periodicals. It has been the object of the author to collect this scattered material into a single volume and present it in a concise form. The article on the stomach may be taken to illustrate the author's method of handling this material. After a fairly complete account of the normal physiology, the pathological changes in gastric motility are considered, special attention being given to vomiting, and, on the basis of the considerations adduced, the question of vomiting during and after anaesthesia is discussed and the proposed remedies examined. Gastric pain is next dealt with—its origin generally, its relation to gastric ulcer and gastric contractions, and its diagnostic significance. In this connexion gastric crises and the effects of nerve section are considered. Dilatation of the stomach from pylorospasm and atony are then dealt with and the pathology of acute dilatation discussed at length. Under the heading of normal repair the histology of the healing of wounds of the gastric mucous membrane is described and its bearing on choice of sutures. Much space is devoted to gastro-enterostomy and the modifications of the gastric functions resulting from it, together with the complications that are liable to follow, such as gastric ileus and jejunal ulcer. The effects of pyloric, transverse, and total resection are considered in similar detail. The chapter closes with a long discussion of the etiology of gastric, duodenal, and jejunal ulcers and the manner in which gastro-enterostomy promotes their healing.

Other chapters treat of the mouth, salivary glands, tongue and oesophagus, abdominal organs, peritoneum, pelvic organs and male genitalia, thyroid gland, chest cavity, brain and spinal cord, and the extremities. Each chapter is followed by a copious bibliography, that on the stomach consisting of two hundred and sixty references. These are almost exclusively from German sources.

ANNALS OF MEDICAL HISTORY.

THE first number of the fifth volume of the *Annals of Medical History*[7] has been delayed some three months. Edward Jenner's portrait appears on the cover, and the frontispiece shows another and less pleasing representation of the discoverer of vaccination, whose life is briefly sketched in an editorial article. Otherwise this instalment is very wanting in the fine illustrations which the reader has become accustomed to look for in this valuable periodical. Dr. Horace Manchester Brown's scholarly Mayo Foundation Lecture for 1921 on the anatomical habitat of the soul traces opinions on this subject from Hammurabi to Jean Paul Marat, the physician-revolutionist of the French Terror, who was probably the last medical writer to give the soul a local habitation in the body—namely, in the meninges. In 1596 Descartes, who at one time believed that the soul occupied the pineal gland, subsequently considered that it pervaded the whole body, and rejected all materialistic ideas of the soul. Dr. H. Viets contributes a note on the eponymic history of the ganglion semilunare (Gasseri), showing that it was first described in 1765 by A. B. R. Hirsch, a pupil of Lorenz Gasser of Vienna. The dead but significant controversy between Riolan and Harvey is briefly described by Dr. John Donley. A very interesting account of William Edmonds Horner (1793-1853), Professor of Anatomy in the University of Pennsylvania for twenty-two years and the describer of the tensor tarsi muscle and the cartilages at the bronchial subdivisions, is given by Dr. W. S. Middleton. Since 1919, when the 256 incunabula in the library of the College of Physicians of Philadelphia were catalogued in the *Annals*, such notable additions have been made that Mr. C. P. Fisher now publishes the descriptions of the whole, which now totals 332. Dr. J. E. Sands, in a review of an early paper on malaria, shows that twelve years before Laveran's discovery Meigs, Rhoad, and William Pepper recorded a malarial parasite in the first volume of the Pennsylvania Hospital Reports.

[7] *Annals of Medical History.* (Spring Number, 1923.) Vol. v, No. 1. Edited by Francis R. Packard, M.D. New York: Paul B. Hoeber; London: Bailliere, Tindall and Cox. 1923. (Pp. 94; illustrated. Subscription in Great Britain £2 2s.)

FAMINE AND PESTILENCE IN RUSSIA.

IN a recent pamphlet[8] Dr. P. MÜHLENS, bacteriologist of the Tropical Institute at Hamburg, gives an account of the conditions he met with in Russia when as director of the German Red Cross Expedition he visited that country in September, 1921. There appears to be little doubt that the extent of the famine and epidemic disease which devastated Russia in the years 1921 and 1922 was unparalleled in the modern history of Europe, although periods of starvation followed by pestilence have been frequent in Russia since the earliest times. As the result of the failure of the harvest in 1921 it was estimated that by April, 1922, the number of starving persons in Russia, including the Ukraine, was 40 millions. The mortality was highest among children; the death rate in the first year of life was put at 80 to 100 per cent., and in older children at 30 to 40 per cent. Substitutes for bread were made from bark, acorns, grass, straw, and even clay. Numerous cases of coprophagia were reported, particularly among children. Well authenticated instances of necrophagia and cannibalism occurred, as in previous periods of the history of Russia, especially in the famine years of 1230-31 and 1601-2. The diseases following in the train of famine were hunger, oedema, scurvy, noma, intestinal diseases, dysentery, enteric, and, most important of all, typhus and relapsing fever. The last two diseases were spread in the crowded railway carriages and waiting rooms, and homes and camps for refugees, whose lousiness beggared all description, as well as in common lodging houses in the large towns, and also in the hospitals. Whole families fell ill during the railway journey and many died in the carriages or on their arrival. Owing to the disorganization of the sanitary service the number of notifications did not represent the actual number of cases, but in the Ukraine alone it was estimated that during the first four months of 1922 there were 137,083 cases of typhus, 53,578 of relapsing fever, and 42,388 of enteric. In 1921 alone there were 176,886 cases of cholera in Russia, as compared with not more than 50,000 cases during the whole course of the war. No reliable statistics were available concerning malaria. Owing to the exhaustion of the population by famine and disease the carrying out of effective sanitary measures was practically impossible; but Dr. Mühlens pays a high tribute to the Russian medical practitioners and men of science, who, with the most primitive equipment and in unheated laboratories and often without gas or electricity, were able to carry on work of the highest order.

A TEXTBOOK OF OTOLOGY.

SIR WILLIAM MILLIGAN and Dr. WYATT WINGRAVE have produced a *Practical Handbook of Diseases of the Ear*,[9] which has some resemblance in style and appearance to their much larger work on diseases of the ear. The new volume, whilst covering the essentials of the subject, is less than half the size of the other, and should prove useful to senior students. The authors write with experience gained from both the clinical and pathological aspects, so that the features which have made the larger volume so valuable as a book of reference and a permanent contribution to medical literature are again to be discovered here. The most important part, which refers to examination of the ear and nose, is well and sufficiently done, and if the student will read this section with care and put the directions into practice he will soon acquire a good and systematic method of examining patients.

The most serious criticism which must be offered is the lack of balance in apportioning space to the various subjects. Thus, although the book only contains 191 pages including the index, the reader must reach page 108 before penetrating as far as the outer surface of the membrana tympani. The space given to diseases of the middle ear, internal ear, and intracranial complications seems therefore unduly limited, whilst many rare conditions of the auricle

[8] *Die Russische Hunger- und Seuchenkatastrophe in der Jahren 1921-1922.* Von Professor Dr. P. Mühlens. Sonderabdruck aus *Zeitschrift für Hygiene*, Band 99. Berlin: J. Springer. 1923. (Med. 8vo, pp. 45; 24 figures. 2s. 6d.)

[9] *A Practical Handbook of Diseases of the Ear for Students.* By William Milligan, M.D., and Wyatt Wingrave, M.D. London: William Heinemann. 1923. (Demy 8vo, pp. 191; 72 figures. 12s. 6d. net.)

and external ear are described at some length: some of these, in fact, are scarcely otological at all and fall more appropriately within the province of general surgery or dermatology. The student will, however, find the help that he is likely to require in any direction and the book can be safely recommended. The illustrations, many of which are already familiar, are excellent.

EPIDEMIC ENCEPHALITIS.

DR. LOUIS REYS'S clinical study of the acute stages of epidemic encephalitis and its sequelae[10] is based on his observations of 150 cases of the disease during an epidemic in Strasbourg and Lower Alsace from February, 1919, to 1921. His thesis contains certain additions to knowledge: he describes a labyrinthine form which may occur in association with other signs of encephalitis or independently; he demonstrates the frequency of meningeal reactions in the disease, and gives an account of the late sequelae of epidemic encephalitis. He estimates that while about 30 per cent. of the cases recover more or less completely, 70 per cent. remain invalids for the rest of their lives. The most remarkable and frequent sequel is Parkinsonism, which is almost always progressive. As this sequel may not develop until two and a half years after the acute stages, Dr. Reys urges that every person who has had an attack of epidemic encephalitis should be kept under observation for at least three years. In discussing the prognosis of the different varieties of the disease, he states that the lethargic form is the most serious, as in 76 per cent. of the cases it ends in Parkinsonism. The myoclonic form is the next most important, as in 33 per cent. of the cases Parkinsonism results, and in 25 per cent. other persistent sequelae, such as myoclonus. The prognosis should be guarded also in the pure labyrinthine form, which terminates in Parkinsonism in one out of every three cases. On the other hand, the outlook is much more favourable in the monosymptomatic ocular form. Dr. Reys excuses the absence of a bibliography, which is usually a prominent feature in a French thesis, on the plea that the literature of epidemic encephalitis has grown to such enormous dimensions that the enumeration of even the most essential works is impossible.

The thesis is a valuable contribution to the clinical study of epidemic encephalitis, and is all the more interesting as consisting mainly of the author's original observations.

NOTES ON BOOKS.

THE *First Aid X-ray Atlas of Fractures and Dislocations*,[11] by H. C. ORRIN, is what its title suggests. The numerous illustrations are its essential feature; photographs of the various bones are contrasted with radiographs of typical fractures and dislocations; in addition there are photographs of the cases after the bandages and splints used for first aid have been applied. In the text the skeleton is described, a short account is given of the reasons for the names of many of the bones, each bone and joint is considered separately, and then follow chapters on the various kinds of fractures and dislocations and their suitable treatment. Radiographs are now such a usual feature of books on medicine and surgery that they are almost taken for granted; it is of interest to note that the author of this little manual has recognized their value as illustrations for first-aid teaching; it will be remembered that he had already used radiography for a first-aid atlas of the arteries.

The second part of the second edition of *Grundriss und Atlas der Speziellen Chirurgie*[12] is an improvement on the first, a notice of which was published on May 12th (p. 815). It deals with the surgery of the abdomen and its contents, the uro-genital system, the pelvis, and the surgery of the extremities. More attention should have been directed to modern investigations and methods. For instance, the author in discussing the treatment of congenital hypertrophic stenosis of the pylorus advises dilatation of the pylorus according to Loreta's method, pyloroplasty or gastro-enterostomy, but makes no mention of Rammstedt's operation of simple division of the hypertrophied musculature down to the mucous membrane. In the discussion of gastric analysis no mention is made of the fractional test meal. In addition to the ordinary anterior and posterior methods of performing gastro-enterostomy, it would seem superfluous to describe two others which are never done nowadays. Excision of the stomach is to be done on the lines evolved by Billroth. For the operation of colostomy a small piece of iodoform gauze is to be passed through the mesentery of the colon for securing the spur, and Murphy's button is commended. All the varieties of hernia are fully described and illustrated. Bassini's and Kocher's methods are advocated for the radical cure of inguinal hernia. In the operation for femoral hernia the whole thickness of the pectineus is divided and the upper part stitched to Poupart's ligament to obliterate the crural canal. The chapter on genito-urinary surgery is perhaps the best; most of the recent investigations on the renal function are mentioned. The remainder of the book deals with the extremities, fractures, dislocations, deformities, joints, and a short description of the various amputations and ligature of vessels. The treatment of fractures, according to the diagrams, seems complicated and the splints insecure.

Dr. ISABEL EMSLIE HUTTON has written a small book on *The Hygiene of Marriage*,[13] which gives in clear language and in sufficient detail an outline of the physiology of sex functions and much sensible advice on conjugal relationships. As Professor Louise McIlroy observes in an appreciative foreword to the volume, "The medical profession realizes how much has to be learnt by the pure and clean minded before marriage can be successfully undertaken; it is obviously the most moral who are the least experienced." This book, we consider, is one which could with advantage be recommended by medical practitioners as suitable for parents to hand to sons or daughters who are about to marry. The language is quiet but explicit, the taste and tone are unexceptionable, and the information is generally in accordance with scientific knowledge. In the short chapters on birth control and methods of contraception Dr. Hutton handles a difficult subject with common sense and discretion.

The fifth edition of Dr. ELIZABETH BUNDY'S *Textbook of Anatomy and Physiology for Training Schools and other Educational Institutions*[14] has been revised by Professor Martha Tracy and Dr. Grace Watson, both of Philadelphia. It is not a book having any medical pretensions, but appears well adapted to the purpose for which it has been compiled.

Green's Manual of Pathology and Morbid Anatomy has been well known to many generations of medical students. The original edition appeared in 1871 and constituted almost the first systematic introduction to English students of the cellular pathology associated with the name of Virchow. It must be a source of gratification to Dr. Thomas Henry Green to see his literary offspring attain its jubilee and to know that it is still appreciated by successive generations of students. The present is the thirteenth edition,[15] revised and enlarged by Dr. W. C. BOSANQUET and Dr. G. S. WILSON. The general features of the book remain unaltered, but a considerable amount of new material has been added and many portions have been practically rewritten. The illustrations now number nearly 250 and there are several new coloured plates. The medical student is supplied in this book with a solid foundation of morbid anatomy and pathology on which to base his clinical and therapeutical practice.

The forty-first issue of the *Empire Municipal Directory and Year Book*[16] affords, like its predecessors, a convenient summary of much useful information not readily accessible elsewhere. The lists of municipal authorities and their chief officers throughout the Empire and the summaries of legislation, orders, regulations, and departmental circulars affecting local authorities have been brought up to date. A list of universities and colleges granting degrees and diplomas in public health, with details of the courses offered, notes of

[10] *L'Encéphalite épidémique. Étude clinique: La période d'état. Les séquelles.* By Dr Louis Reys. Paris: A. Maloine et Fils. 1922. (Roy. 8vo, pp. 146; 10 figures. Fr. 8.50.)

[11] *First Aid X-ray Atlas of Fractures and Dislocations.* By H. C. Orrin, O.B.E., F.R.C.S.Edin. London: Baillière, Tindall, and Cox. 1922. (4½ × 7, pp. viii + 78; 46 figures, 18 plates. 3s. 6d. net.)

[12] *Grundriss und Atlas der Speziellen Chirurgie.* Tiel II. Von Professor Dr. G. Sultan. Zweite umgearbeitete Auflage. Munich: J. F. Lehmann. 1923. (Cr. 8vo, pp. viii + 576; 365 figures, 40 plates. 14s. 5d.)

[13] *The Hygiene of Marriage.* By Isabel Emslie Hutton, M.D. With a Foreword by Professor A. Louise McIlroy, M.D., D.Sc. London: William Heinemann (Medical Books), Ltd. 1923. (Post 8vo, pp. 112. 6s. net.)

[14] *Textbook of Anatomy and Physiology for Training Schools and other Educational Institutions.* By Elizabeth R. Bundy, M.D. Fifth edition, revised and enlarged. London: J. and A. Churchill. (Demy 8vo, pp. xv + 442. 11s. 6d. net.)

[15] *Green's Manual of Pathology and Morbid Anatomy.* Thirteenth edition, revised and enlarged. By W. C. Bosanquet, M.A., M.D.Oxon., F.R.C.P.Lond., and G. S. Wilson, M.D., M.R.C.P., D.P.H.Lond. London: Baillière, Tindall, and Cox. 1923. (Demy 8vo, pp. viii + 624; 7 plates, 244 figures. 21s. net.)

[16] *The Empire Municipal Directory and Year Book for 1923–24.* London: The Sanitary Publishing Company, Ltd., 8, Bream's Buildings, E.C.4. 1923. (7 × 11½, pp. 348. 10s. 6d. net, post free 11s.)

the principal legal decisions affecting public health and local government, are amongst the new features included in this year's edition.

Stories founded on medical practice are common enough, but in *The Adventures of a Private Nurse*,[17] by Miss Eva Riddock, we have an example of a similar work written by a nurse. The book consists of fourteen chapters dealing with her life with various patients. Though the style is somewhat pedestrian, the stories are vivid and convey an air of sincerity.

The last edition of the *Financial Times Investors' Guide* was issued towards the close of 1913. Since that date the war and the subsequent unstable state of affairs have made it impossible to prepare a new edition which would fulfil anything like its original purpose. The new edition (price 3s. 6d.) contains information that should be possessed by everyone who has dealings in money matters. It is given in a form that can be readily understood by those who have no technical knowledge. Separate chapters are devoted to the various classes of securities. The book appears to be a reliable guide for those who plan their investments on non-speculative lines. Present holders of the old railway stocks will find a useful table giving the names and amounts of stock in the new companies to be given in exchange for each £100 of stock of the old companies.

[17] *The Adventures of a Private Nurse.* By Eva Riddock. London: The Scientific Press, Ltd. 1923. (Cr. 8vo, pp. 240. 3s. 6d. net.)

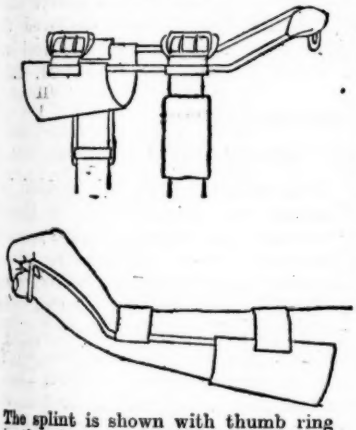
MEDICAL AND SURGICAL APPLIANCES.

Cock-up Wrist Splint of Duralumin Wire.

Mr. A. Wilfrid Adams, M.S., F.R.C.S., Assistant Surgeon, Bristol Royal Infirmary, writes: The purpose of the splint is to secure dorsiflexion of the wrist. This is the posture naturally assumed by the hand in grasping an object, and is recognized as the optimum position for ankylosis, since the grip is ineffectual if the wrist is not dorsiflexed. When ankylosis is a possible sequel it is imperative during healing that the joint should be maintained in this optimum position.

The splint consists of two side wires with cross bars ventrally at palm and upper forearm, with dorsal strap over the wrist. The framework is made of duralumin wire 4 mm. in diameter. For an average man a continuous length of 26 in. is adapted to the sides of the forearm crossing the front of the palm.

On the outer aspect the wire commences at the junction of the upper and middle thirds of the forearm and passes in contact with the latter straight to the wrist-joint. There it is bent outwards and dorsally to adapt it to the back of the first interosseous space till it reaches the cleft between thumb and forefinger, leaving the thumb free. This angle should be determined by placing the hand in the position which it normally assumes in making a fist. With the necessary slight obliquity the wire is next carried across in front of the heads of the metacarpal bones to the ulnar margin of the hand along which it proceeds to the wrist; and following the inner aspect of the forearm finishes on a level with the outer wire. It should be noted that painful pressure results if the wire is not bent well away from the base of the first metacarpal.



The splint is shown with thumb ring in the above diagrams; in the upper from the radial aspect. Chamois pads from the ulnar and in the lower and buckles are omitted from lower diagram.

If the splint be used to regain extension in a partly ankylosed wrist the wire is adapted to the flexed position and can be bent up later as the deformity yields to the steady pressure of the dorsal strap.

Joining the upper 2 inches of the wires and curving round in front of the forearm is a thin duralumin trough covered with leather. This holds the upper ends of the lateral wires rigidly apart and automatically maintains apposition with the arm owing to the tendency of the hand to flex and so tilt the trough dorsally. A strap and buckle pass over the back of the forearm at this level. To the ulnar wire at the wrist is attached a second strap with buckle. This passes over the back of the lowest inch of the forearm, round the radial wire, and then doubles back again to the buckle on the inner side; on the tightness of this depends the degree of dorsiflexion of the wrist. Where greater security is desired at this point, as in Colles's fracture, the strap completely encircles the limb. Small chamois leather pads are attached to the straps where they press on the limb, also leather-covered padding surrounds the oblique palmar bar. When used for nerve lesions of the extensors the outer end of the palmar wire is bent into a half-circle in which the thumb rests and is kept extended, so relaxing the extensor longus pollicis. It is desirable in all and essential in some cases that the splint be made to measure. For this Messrs. Ferris and Co., Bristol, require an outline of the hand and forearm traced on paper, palm downwards.

The dorsal wrist strap is adjustable and presses the wrist forward, causing the required degree of dorsiflexion at the joint, the palm and forearm being fixed where they rest against the unyielding frame ends.

Indications for Use.

A. To support the wrist dorsiflexed during some healing process, as for instance—

1. Sprains and injuries to bones about the wrist as in Colles's fracture, fractured carpal or metacarpal.
2. During healing of wounds, either accidental or surgical, such as tendon transplantations or ganglionectomy.
3. Inflammatory affections such as occupational tenosynovitis, painful rheumatoid affections, and tuberculous or septic infections.

B. To correct the deformity of a dropped wrist—

1. Paralytic dropped wrist—when a splint is needed for months or years.
2. Partial fibrous ankylosis of the wrist in a dropped position following paralysis or inflammatory lesions.

Special Advantages claimed for the Splint.

1. It is comfortable to wear and inconspicuous.
2. It is lighter than other forms of cock-up splints and yet is of adequate strength. The weight of a splint made for a man is only 6 oz., which is so distributed as to be scarcely perceptible to the wearer.
3. It does not prevent the use of the digits for grasping and the wearer can dress himself, feed himself, write, shake hands, etc. A minimum of worry from splinting is entailed. These are important factors when the patient is undergoing treatment lasting for months and where intermission would be disastrous.
4. The need for removal of the splint is greatly reduced in cases where dressings have to be changed, as the surface of the part is almost entirely exposed.

An Improved Antrum Exploring Trocar and Cannula.

Mr. H. Mortimer Wharry, F.R.C.S., Laryngologist to the Mount Vernon Hospital for Diseases of the Chest, writes: In the antrum trocar described below I believe I have been able to combine the simplicity and directness of the ordinary straight trocar and cannula with two points of safety and convenience which have not hitherto been obtained without unnecessarily complicating the instrument. First, in puncturing the medial wall of the antrum below the inferior turbinate I prevent the instrument from penetrating or hitting any of the further walls by means of a small ring placed round the cannula at a distance of 1/2 inch from its distal end, and 5/8 inch from the point of the trocar; this ring is very small and inconspicuous, in no way adding to any difficulty in manipulating the instrument inside the nose, but is quite sufficient to check the instrument. The

second point is one of convenience, and consists in an improved joint between the nozzle of the syringe and the cannula. It sometimes happens with the ordinary joint that when extra pressure is required from the syringe, the nozzle flies out and the lotion is squirted everywhere. The improved joint can be held together by the finger and thumb with the utmost security. Provided that the antrum is punctured in the right place, and the Higginson's syringe tied firmly to the nozzle, I believe this to be an "accident-proof" instrument. It was recently shown at the Laryngological Section of the Royal Society of Medicine. This instrument is not safe for sphenoidal puncture as the guard is too far back, but an instrument made by the same makers has a guard 3/8 inch from the point of the trocar, and is suitable for the sphenoid. I am indebted to Messrs. Mayer and Phelps for the excellent way they have carried out my design.

Nova et Vetera.

CHARLES GABRIEL PRAVAZ.

VERY little is heard of orthopaedic practitioners before the time when Stromeyer recalled the attention of surgeons to deformities and their treatment. In this country Chessher's name has survived, thanks among others to George Eliot, but we only have allusions to him and his methods. Shaw and Harrison, especially the former, were pioneers in the treatment of deformities in the first generation of the nineteenth century. A name which arises in one's memory is that of T. Sheldrake, who was consulted by Byron after another man of the same name had failed to cure the poet. Sheldrake bulks large in the early issues of the *Lancet*. In the volume for 1828-29 there are nine communications from this gentleman, some of them of considerable length, with a commendatory note from the editor; yet from all this mass of verbiage it is impossible to gather what means he employed to achieve the cures of club-feet of which he boasted. Sheldrake asserted that he had studied under the Hunters and others, although he had no legal qualifications. Despite the sponsorship of Mr. Wakley, we must conclude that his methods were those of a quack.

A very different personage, and of a later generation than Sheldrake, was the French orthopaedist Pravaz, who is best known as the inventor of the syringe with a hollow needle which has since been known by his name. This was devised by him in order to inject iron perchloride into an aneurysm, and it was the parent of all the needles and syringes so widely used for aspiration and injection at the present day. At first the needle was made in two halves which were soldered or brazed together, but after the war of 1870 the well known surgical instrument maker Charrière bought from the French Government its stock of mitrailleuse barrels and drew them out into hypodermic needles, thus affording a striking analogy to the prophecy of Micah. Attention has recently been called to the importance of the work of Pravaz by Dr. Grangée of Aix-les-Bains in the *Revue de Thérapeutique Moderne Illustrée*. This writer gives the credit of having been the first to use subcutaneous injection of a drug to a Scottish surgeon named Wood, whom we are unable to identify.

Pravaz was born in 1791 in the south-east of France, and became Doctor of Medicine at Paris in 1824. Connected by marriage with the proprietress of a girls' school, he attended the pupils professionally and thus had his attention directed to the treatment of scoliosis, and ultimately the girls' school became an orthopaedic institute. He cannot have had a very extensive experience of curvature of the spine when, in 1827, he published his *Méthode Nouvelle pour le traitement des déviations de la Colonne vertébrale*. Nevertheless this book and his clinical work were favourably reported upon by a commission of the Academy of Medicine in 1829. In it he described his progressive extension bed, which figured later in his treatment of congenital dislocation of the hip; he paid tribute to the work of Bampfield, Shaw, and other surgeons of this country, whose foggy sky and damp climate favour (so he says) the production of deformities.

But Pravaz's chief claim to remembrance as an orthopaedic surgeon is the advance he made in the treatment of congenital dislocation of the hip. According to Malgaigne, Humbert de Morley had published in 1835 an account of five cases of this deformity of which the cure was said to be confirmed, but these successes were generally regarded as equivocal. Pravaz then took up the question, and after a much-talked-of successful case which afterwards relapsed, he presented to the Academy of Medicine in 1838 a girl whose cure was vouched for by a commission. The Academy sanctioned the conclusions of the commission, although Dr. Bouvier strongly dissented. Pravaz, who had removed his orthopaedic institute to Lyons, persevered with his method, and in 1847 he published his *Traité théorique et pratique des luxations congénitales du fémur*, in which he gave details of nineteen cases. Between the date of publication of this monograph and his death he treated eight more cases, making twenty-seven in all, with a percentage of success at least as high as that attained nowadays, if we are to credit the testimony of the numerous surgeons who examined a number of his patients some years after their cure.

Pravaz alone in his time seems to have seized upon some at least of the principles by which congenital dislocation of the hip can be cured. He relied on long-continued extension with weights amounting in some cases to more than 40 lb., after which he reduced the dislocation by abduction and pressure on the great trochanter and maintained the reduction in the abducted position by means of a belt. He seems to have realized thoroughly the necessity of re-forming the articulation of active movements of the thigh and consequent pressure and friction of the femoral head in the acetabulum. All these measures, except the first, are now recognized as right and necessary. Pravaz had not the advantage of using plaster-of-Paris, which was then only beginning to be employed by Bouvier in Paris for the treatment of club-foot, and his apparatus appears to have been elaborate and difficult to manage. There can be no doubt of the functional value of his results in many cases, and if, as Professor Nové-Josserand of Lyons has recently suggested (*Revue d'Orthopédie*, May, 1921), his cures were not genuine reductions, but anterior transpositions, his patients were nevertheless immensely benefited thereby.

When Pravaz died his success was still disputed in Paris and elsewhere. Malgaigne in his classical work on fractures and dislocations stated that he had not seen any of the cured cases. Gillebert D'Hercourt, the pupil and successor of Pravaz, continued his practice at Lyons and published a number of pamphlets vindicating the method and its author, but gradually both fell into neglect and oblivion. This neglect is hard to explain. Possibly if the orthopaedic institute had been in or near Paris it would have won greater appreciation and the profession of the capital would have had better opportunities of testing the worth of Bouvier's dicta, that congenital dislocation of the hip was incurable and that no case had been cured. Bouvier was at that time a great authority on orthopaedic surgery and his influence, coupled with the complexity and long duration of Pravaz's treatment, probably retarded progress for forty years, that is until Pacci rediscovered the principles of Pravaz, and Lorenz added to them and improved their application by using plaster-of-Paris. Whatever the cause, it is a tragedy that nearly two generations of hip-luxated cripples should have been deprived of benefits such as they might have enjoyed had the work of Pravaz been carried on.

E. M. L.

MINERS' NYSTAGMUS.

THE Miners' Nystagmus Committee appointed in 1920 by the Medical Research Council was invited by the Home Office, and later by the Secretary for Mines, to give special attention to the great increase which was taking place in the claims for compensation due to miners' nystagmus. The Committee issued a first report about fifteen months ago; it dealt generally with the subject of miners' nystagmus as an occupational disease. Its main conclusions, which were given at some length in our columns of April 22nd, 1922, were that the essential factor in the production of miners' nystagmus is deficient illumination, due to the low illuminating power of the safety lamps generally used; that workers at the coal face are more affected than other underground workers; and that distinct signs of nystagmus are present in a large proportion of coal miners, though only in a small proportion do the symptoms ever become so severe as to cause even temporary incapacity for underground work. The Committee recommended that the standard of illumination should be improved by the use of the electric cap lamp, or some other method which brings the light near the working area without shining directly into the eyes, and by an increase of whitewashing and stone-dusting.

The Committee has now issued a second report[1] treating of "incapacity resulting from miners' nystagmus and the relative importance of errors of refraction in miners' nystagmus." Both sections are by Mr. G. H. Pooley, F.R.C.S., of Sheffield; the introduction states that Dr. T. L. Llewellyn has given his help, and that the Committee is in entire agreement with the views expressed.

The report makes it clear that a distinction must be drawn between the presence of physical signs distinctive of miners' nystagmus and the existence of incapacity arising therefrom. Many observers in various countries have found that a large proportion of underground miners while still at work exhibit signs of miners' nystagmus, which, *if complained of*, might establish a claim for compensation. In America, where no compensation is given, little is heard of the existence of the disease. In Germany the incidence of claims was 0.3 per cent. to 1913, but on limiting compensation to the serious cases it has fallen to 0.03. In Belgium, with a uniform method of compensation the incidence has remained at 0.2 to 0.4 per cent. In England the admission of cases of psychoneurosis to compensation increased the incidence of claims; the rise and fall of wages (whilst compensation remained unaltered) was reflected in the number of claims: as the number of claims for incapacity increased, the duration of the cases extended, so that the percentage of claims in each year which lasted for four weeks and over grew larger. It is such factors as these that increase the claims, for "there is no sound evidence of increase in the clinical entity, miners' nystagmus."

Definite visible oscillation of the eyes, permanently present when the eyes are above the horizontal level, is the common Continental standard of incapacity. In England compensation may be awarded on a claim "whether the symptom of oscillation of the eyeballs be present or not"; the definition does not distinguish between incapacity due solely to miners' nystagmus and incapacity due to other causes, such as hysteria, etc., in miners who attribute their incapacity to miners' nystagmus.

On the Continent miners only stop work for severe attacks; the great majority return to work in a few weeks; anything like a year's absence is quite abnormal. The Committee visited Belgium, where miners' nystagmus is looked upon as a benign affection, recovery from which is expected in a short time; yet the cases observed presented the same clinical features as those in this country, while men were seen working happily with well marked signs of the disease. When the British and Continental standards were similar our miners worked much as they do now abroad; with the altered British definition, to-day a large and ever-increasing number claim and obtain compensation, many for long periods. Figures are given upon which these conclusions are based.

"The contrast between the length of incapacity on the Continent and in this country challenges attention, and indicates that the economic problem of nystagmus lies far more in an undue protraction of disability claims than in the number of original claims."

"We have ourselves known miners drawing compensation for nystagmus who were incapacitated by such conditions as melancholia, general paralysis of the insane, valvular disease of the heart, hemiplegia, paralysis agitans, bronchitis, and an injured knee. These men had been able to work notwithstanding the oscillation of their eyes until other troubles appeared."

"The standard for certification in vogue in this country undoubtedly lends itself to misuse, and we consider it should be altered.

"We recommend that miners should be considered to have nystagmus sufficiently severely to be certified for compensation if oscillation of the eyes is constantly present even when the miner is looking at or below the horizontal level in daylight, or if it persists for five minutes in a good light with the eyes at the horizontal level, after it has been induced by darkening the room and using suitable exercises."

In the second part of this report are given the refractions in 130 cases of miners' nystagmus and of normal miners. The analysis discloses no relation between errors of refraction and nystagmus: the "errors of refraction in themselves have no effect whatever either on the incidence of miners' nystagmus or on the age at which incapacity commences from miners' nystagmus." This conclusion corresponds to that of earlier investigators, such as Snell, Dransart, Stassen, and Coppez, and is in conflict with Anderson, who in 1920 contended that errors of refraction are the principal cause.

[1] Second Report of the Miners' Nystagmus Committee. Privy Council. Medical Research Council. London: His Majesty's Stationery Office. 1923. Pp. 35. Price 9d. net.

THE FELLOWSHIP OF MEDICINE AND POST-GRADUATE EDUCATION.

THE report presented to the annual meeting of the Fellowship of Medicine and Post-Graduate Association by the honorary secretaries, Mr. Herbert J. Paterson and Dr. Henry MacCormac, was as follows:

"Since the period covered by the last report of your honorary secretaries, 160 post-graduates have been enrolled. Of these 50 were resident in Great Britain, 61 from the Colonies, and the remainder from the United States, the Continent of Europe and such distant lands as China, Syria, South America, and Barbados. Special courses have again been given by the following hospitals: The Prince of Wales's Hospital, the Infants' Hospital, the 'Children's Clinic'—Western General Dispensary, National Hospital for Diseases of the Heart, the London Lock Hospital. In September last a very successful course in General Medicine was given by several of the post-graduate hospitals combined with Middlesex and St. George's Hospitals. Thirteen post-graduates were enrolled for the course. By the kind permission of the Royal Society of Medicine the series of weekly lectures has been continued at intervals. Many well-known physicians and surgeons have been good enough to deliver lectures, and the average attendance has been thirty.

"Since January 1st, 65 new members of the Fellowship have been enrolled, and the number of regular annual subscribers is now 150. That the work of the Fellowship of Medicine continues to fill a definite want is evident from the large number of appreciatory letters received from those who have availed themselves of the facilities provided.

"Towards the close of the year, representatives of the various Post-Graduate Hospitals put forward some valuable suggestions to the Fellowship of Medicine for closer co-operation between the Fellowship and the various hospitals. These suggestions were warmly welcomed and adopted by your Council, a special committee being appointed to carry them into effect, and as a result vigorous efforts for the furtherance of the aims of the Fellowship are being made. The constitution and by-laws have been revised by the same committee for submission to the annual meeting according to the resolution passed by your Council. We are particularly gratified to be able to report that various refresher and special courses have been arranged right up to June of next year, so that throughout the whole year one or more courses will be available for those who desire to do post-graduate work. There is every hope that as a result of what is being done, London will become a live centre of post-graduate teaching. Perhaps we may be allowed to quote from an article by Dr. Emmet F. Horine of Louisville, who spent some months in this country investigating the facilities for post-graduate teaching. 'As to the future of post-graduate work in London I consider it very bright . . . I am certain from what I have seen that it is only a question of time when a wonderful institution will be opened.'

"Once again we must express the great debt owed by the Fellowship to the Royal Society of Medicine for their continued support and generosity in placing an office at our disposal. The President of the Society, Sir William Hale-White, has taken a keen and personal interest in the new efforts which are being made and his valuable help has been given to us in many ways. In conclusion, we desire to place on record the appreciation of the honorary officers of the valuable and devoted service which the honorary, Miss Willis, and her assistant, Miss Roy, have rendered to the Fellowship of Medicine."

Great regret was expressed by the members attending the meeting that Sir George Makins had decided to retire from the office of President; a cordial vote of thanks to him was adopted. Sir Arbuthnot Lane was elected President in his place. The new constitution of the Post-Graduate Association of the Fellowship was unanimously approved. The constitution provided that the General Council should consist of twenty members, and they were accordingly elected. At a subsequent meeting the Executive Committee was also appointed, consisting of the honorary officers and seven members elected by the General Council.

British Medical Journal.

SATURDAY, AUGUST 18TH, 1923.

THE REMUNERATION OF INSURANCE PRACTITIONERS.

THE Minister of Health has undertaken to inform the medical profession, by October 1st next, what his proposals are for the terms and conditions of service of insurance practitioners for the year 1924 onwards. These terms and conditions are a matter not only of professional but of national importance. The national object is to secure for certain large classes of the population medical attendance and treatment of the type contemplated in the insurance scheme, upon conditions such as will obtain for the insured person a wide freedom of choice among practitioners, and service from any practitioner chosen certainly not inferior to that which could be given under any other system. To secure this from the profession it is essential that the extent and character of the services required shall be clearly understood, that the conditions under which these services are to be given are not inconsistent with the honourable traditions of the profession as interpreted by its representative authorities, and that the financial reward of the services shall be such as to justify the expectation that every practitioner will use his highest skill and utmost endeavour in the interest both of his individual patients and of the national health. These three essentials cannot be separated; without any one of them there will be relative failure. Attention must not be concentrated upon the question of money payments to the exclusion of the others, nor should this be regarded as of more or less importance than they.

For many months past the Insurance Acts Committee, on behalf of insurance practitioners and with the authority of the British Medical Association, has been engaged in an investigation with regard to the first two of these points. It has sought information from the Ministry, from Insurance Committees, from approved societies, from all and sundry, as to all those things in which it was alleged, rightly or wrongly, that the insurance service was imperfect or that the work and conduct of practitioners was less satisfactory than it should be. It is acknowledged that, here and there, there are some practitioners who are doing less than may properly be required of them; and that there are a number of imperfections in the service as a whole, though it is found that these are due by no means always to the doctors but mainly to the ignorance or carelessness of insured persons themselves or to difficulty or laxity of administration in other quarters. The Committee has made, or has accepted, a number of suggestions which, it is believed, meet all legitimate criticisms, and which must, if carried out, be to the great advantage of insured persons and of the service generally. They are contained, in the main, in a memorandum published in the SUPPLEMENT to the JOURNAL of May 19th last, though they were amended in some minor details by the Conference of Local Medical and Panel Committees in June and have been amplified in some respects by further communications to the Ministry. They have, moreover, been regarded as satisfactory by a number of the most influential and representative members of Insurance Committees and of Approved Societies.

There is only one important point on which some misunderstanding still appears to exist in some minds. It is understood that the range and extent of medical attendance and treatment to which insured persons are entitled under the scheme is that which can be properly given by general practitioners as a class; and that services of a specialist character, by whomsoever given, have to be provided for in some other way. Any restatement of this matter is designed to emphasize the width of this range of service, and to ensure that, while not impugning the right of any registered medical practitioner to perform any medical or surgical service which he deems appropriate, no insured person shall be charged a fee for any treatment unless it is proved to be of a specialist type, and unless any insurance practitioner who himself gives it is judged to have the special experience or skill desirable. It may be that it is financially necessary to maintain at present this limitation on the range of service; or it may be that the insurance funds are so ample that they could bear the cost of a complete specialist and institutional as well as of a complete general practitioner service. Some officials of the approved societies appear to believe this. It is not improbable that the whole expenditure of the country on health services might, if more wisely distributed, be capable of meeting the cost of an unlimited service; and it is certain that the profession is not only willing but anxious that the service shall be made as complete as possible under appropriate conditions. The immediate point to note, however, is that in discussing the remuneration of insurance practitioners reference is made now, as it always has been, to a service of the general practitioner type—wide, highly skilled, comprehensive as that service must be recognized as being.

More recently the attention of the Insurance Acts Committee has been specifically directed to a calculation of the capitation fee on the basis of which shall be formed the Central Practitioners' Fund, on the proportionate distribution of which each practitioner's remuneration depends. The Committee's very important memorandum on this subject was published in the SUPPLEMENT to our last week's issue. The best starting-point for such calculation is the arbitration award of 11s. early in 1920. This has to be adjusted to the conditions of the immediate future. The main adjustments required are for the cost of living and of carrying on practice. An authoritative statement as to the former of these adjustments will be found in the memorandum by Professor Bowley, published in connexion with that of the Committee. On this, as the finding of an independent scientific economist, the Committee is entitled to rely. The arbitrators gave no reasons for their award, but it is permissible to search for some definite calculation that may be presumed. There is one such calculation which the Committee has not explicitly set out in its memorandum but which entirely supports the figures at which it had arrived. The average original capitation fee was 7s. 3d., but the minimum available in some areas was only 7s. The percentage increase claimed (on the grounds now under consideration) in 1920 was 60, and though Professor Bowley agreed that this was a moderate estimate, his own calculation of costs severely cut down was 57 per cent. If we assume that the arbitrators used the lowest figure

in each case, we find that a 57 per cent. increase on 7s. is 4s., and that this exactly gives the actual award. Professor Bowley's corresponding percentage to-day is 48, which gives a capitation fee of 10s. 4d. It is difficult, if not impossible, to discover any justification for a fee lower than this.

The Committee wisely claims that the medical remuneration, when properly arrived at, shall be a statutory first charge on the National Health Insurance Fund, and points out that in existing circumstances this need entail no additional charge whatever upon the employed person, the employer, or the taxpayer. This main proposition must surely be regarded as axiomatic; and with regard to the capacity of the Fund we need do no more than refer to the expert review of its financial position published in the Supplement of May 26th last, to our leading article thereon, and to the official statement of accounts for the year ended December 31st, 1921, published on June 6th by His Majesty's Stationery Office. The claim of the Committee is amply justified by the official figures.

For such an insurance medical service as may be obtained, improved as it can be not only with the goodwill but largely at the behest of the profession, the nation will, within the limits of its insurance scheme, be prepared to see that adequate remuneration is forthcoming. There is no reason why the Government and approved societies, whose interest alike it is to secure the best possible service, and assured as they are that the profession is anxious to provide it, should be unwilling that this provision should be made. The decision of the Government and such consequent legislation as may be necessary during the autumn session of Parliament will be regarded by the whole profession, and not merely by insurance practitioners, as of the utmost importance. For the facts of the case clearly show that any reduction in the remuneration of insurance practitioners must have an early reaction on the status and emoluments of other branches of the profession.

THE INVESTIGATION OF DISEASES OF THE STOMACH.

The discussion in the Section of Pathology at Portsmouth, which is published in this issue, reveals the fact that modern methods of investigation of diseases of the stomach, particularly by means of the fractional test meal, have done much to advance our knowledge both of the physiology and pathology of the organ.

In the fractional method small fractions of the stomach contents are extracted every quarter of an hour after a test meal, and the percentages of free hydrochloric acid and the total acidity estimated, the percentages being plotted as curves. Dr. Bolton has shown that such curves cannot be looked on as a correct index of the gastric secretion, since they fail to take account of the hydrochloric acid neutralized and present as inorganic chloride. This neutralization normally regulates the acidity of the stomach contents, and is due to regurgitation of the pancreatic juice from the duodenum. When this is allowed for, and the total chlorides of the gastric contents estimated, the figures give the true secretory curve of the stomach. It has been argued that specimens so obtained are not consistent samples of the stomach contents, and that the manipulation necessary may disturb the secretory activity; but if precautions are taken to ensure a tranquil environment, and the method is skilfully carried out, little difficulty arises on this score. The general direction taken by the curves representing the total acidity, free hydrochloric acid, and total chlorides is fundamentally different in various pathological conditions of the stomach, as Bolton and Goodhart have shown. Characteristic curves are often of great diagnostic assistance, but their chief value at present is the light they throw on the behaviour of the stomach in different types of disease. Perhaps the best example is the condition known as acid dyspepsia or hyperchlorhydria. This was at one time thought to be due to an excess of hydrochloric acid in the gastric juice, but the fractional test meal has shown that the essential cause is not a secretory abnormality but a deficiency in the neutralizing process which regulates the acidity of the gastric contents, due to irritability of the pyloric sphincter. The hydrochloric acid curve does not show the normal ascending and descending limb, but continues to climb till the stomach is empty, showing that duodenal regurgitation has not occurred. The curve may also show other irregularities due to partial neutralization. Hyperchlorhydria is the result, therefore, of a neuromuscular irritability of the pylorus. This accurate picture of the mechanism by which acid dyspepsia is produced enables us to understand the method of action of two drugs which have long been known to relieve the symptoms of this disease. Alkalis given one and a half to two hours after meals replace the deficiency in duodenal regurgitation, and atropine relaxes the pylorus, thereby allowing the normal process of neutralization to be effected.

Much light has been thrown also on the opposite set of symptoms of gastric secretion; fractional test meals have enabled us to distinguish three separate varieties of subacidity. When the stomach is atonic and peristalsis diminished, the pylorus also is often hypotonic, and allows excessive regurgitation to take place, thereby leading to excessive neutralization. In such cases the secretion of gastric juice may be normal. The fractional test meal method distinguishes this pyloric default from a second possible cause of subacidity, due to a simple diminution in the amount of gastric juice secreted; the curves then obtained are altogether different. Thirdly, it brings into relief that rare but interesting disease, achylia gastrica, in which there is an entire absence of gastric juice. The newer methods have confirmed the previously established generalizations that subacidity occurs in malignant disease of the stomach, pernicious anaemia, and gastritis, and further researches will probably elucidate the manner of action in each of these different conditions.

As will be seen from a study of Dr. Bennett's paper, the fractional test method is of great assistance in the diagnosis of cancer, for he says that it is exceedingly rare for a case of carcinoma of the stomach to present itself for examination without the diagnosis being definitely established the moment gastric analysis is performed. Here special attention is directed to the contents of the fasting stomach; analysis almost invariably reveals evidence of stagnation of the gastric contents, or of haemorrhage with aberrant secretion, signs which are not likely to be confused with those given by other diseases. He recommends as an indicator for stagnation the overnight administration of charcoal in milk; the extraction of the gastric contents must be performed next day with care to avoid any damage to the mucous membrane which might give rise to bleeding. In all but 3 out of 53 cases in which the clinical diagnosis of

gastric carcinoma was definitely made, stagnation was shown to exist either by the presence of visible charcoal, or the foul odour, or the high concentration of lactic acid. Dr. Ryle drew attention to the valuable information to be derived from an examination of the resting secretion of the stomach. Its amount, consistency, naked-eye appearance, odour, and cytology all supply information of great assistance to the understanding of gastric disorders.

In a discussion such as this, in which physicians, surgeons, and pathologists all took part, it was natural that there should be a certain amount of difference of opinion as to the value of different tests, their interpretation and significance; and evidence of dissension on minor points is provided by a perusal of the printed papers. But two observations were frequently made by different speakers, and seemed to meet with general approval. The lack of intimate co-operation between the laboratory worker and the clinician was deprecated, and more than once the view was expressed that if the physician or surgeon himself performed the gastric analysis he would derive far more information from the result of the test than by merely sending the specimens to a laboratory without any history or account of the symptoms. Should the clinician himself not be able to carry out the test he should give the fullest possible information to the co-operating pathologist, and not regard him as a mechanical oracle, always capable of supplying a satisfactory answer. "Yes" or "No" pathology is of little use in gastric analysis. The lack of consideration for macroscopic characters of gastric samples was frequently deplored. The advances of biochemistry have tended to direct too much attention to the difficult and complicated tests, almost as though it were to be expected that the more intricate analysis would necessarily lead to the more valuable conclusions. In this pursuit of the refinements of chemistry the naked-eye and nose evidences of the specimen to be examined are often neglected. We seem to have forgotten the valuable deductions that were made by our predecessors from the quantity, colour, consistence, and odour of the stomach secretions, and these should always be the first properties to be thoughtfully considered.

CLEAN MILK.

EDUCATION, alike of the milk producer, the milk distributor, and the milk consumer, proceeds apace, each of the three reacting on the others. Three pamphlets just issued almost simultaneously* are of much interest in this connexion. In one of them Dr. J. M. Hamill of the Ministry of Health gives a concise and instructive account of the whole subject of pasteurization. That process is, we presume, admitted by everyone to be merely a short cut to the production of milk which will be safe, and will keep sweet long enough to allow it to be used domestically after distribution from producer to wholesaler, to retailer, and finally to consumer. To the idealist that may seem a lowly aim, but the babies and children of this generation cannot wait through the long years that will elapse before all milch cows are free from tubercle and all dairy premises and processes are brought to perfection. This has been realized on the other side of the Atlantic, where Chicago has made pasteurization of its whole milk supply compulsory.

In this country pasteurization is being more and more resorted to, and the Ministry of Health has done well to issue Dr. Hamill's notes on the subject. After stating exactly what he means by pasteurization, he discusses its effect on bacteria and on the chemical and physical character of the milk. He points out that pasteurized milk requires as much care in subsequent handling as clean raw milk, but at the same time he rebuts the assertion that bacteria grow faster in pasteurized than in raw milk, the rate of growth being about the same in both. Yet pasteurization will not be a substitute for cleanliness. It will reduce the number of bacteria, but the number remaining will not be so low as if the milk had been cleaner to begin with. He discusses the three methods of commercial pasteurization—"Flash Pasteurizers," "Retarders," and "Holder Pasteurizers"—and favours the last named, especially against the first. Throughout his notes Dr. Hamill confines the term "pasteurization" to the process of heating to not less than 145°F. and not more than 150°F. for a period of thirty minutes. So defined it has little or no influence on the flavour of the milk, nor does it practically affect two of the three vitamins—fat-soluble A and water-soluble B—but it does weaken the vitamin C, the antiscorbutic, and towards limitation of this effect air should, as far as practicable, be excluded during the process. Lactic acid bacteria are largely reduced and souring of milk correspondingly prevented. That the rising of the cream to the surface is partly prevented if the pasteurizing temperature is 148° or 150° is of no real consequence, as the amount of fat in the milk is not diminished, though the purchaser's suspicions may be aroused as to the honesty of the seller. The essay is full of useful information and comment, and concludes with some observations on pasteurization of milk in bottles.

In the second pamphlet Mr. A. T. R. Mattick of the National Institute for Research in Dairying at Reading discourses on the whole subject of the production of clean milk; and in the third the National Clean Milk Society describes the method of conducting milk competitions, which are now annual events in several counties. Mr. Mattick deals clearly, tersely, and with obviously intimate knowledge, with every detail of the business as it ought to be conducted. Milking sheds, cowsheds, milk rooms, sterilizing rooms, dairy utensils, churns, the conversion of coppers into steam sterilizers, the milking process, refrigerators, strainers, and bottling, are all considered. He emphasizes the importance of light and water and steam as fundamentals, but urges that these and the most modern appliances will not in themselves bring success in producing clean milk. The human element comes first. He tells all about what constitutes a first-rate cowshed, but gives a photograph of a wooden-walled, thatch-roofed, old shed, in which first-class results were obtained by a cowkeeper who had mastered the fundamental principles of cleanliness. A proper water supply, being of essential importance in respect alike of the condition of the premises, the supply of steam, the cooling of milk, and the toilet both of the cow and the milker, must lay a heavy burden on the occupier of an old-fashioned farmsteading, where the water has to be pumped from a shallow well, and no doubt one effect of the new requirements of proper milk production

* (1) *Notes on the Pasteurization of Milk.* By J. M. Hamill, O.B.E., M.D., D.Sc., Medical Officer of the Ministry of Health. London: H.M. Stationery Office. (8vo, pp. 14; 2d.) (2) *The Production of Clean Milk.* By A. T. R. Mattick, B.Sc., University College, Reading. Published by The Dairyman Ltd., 43, Great Tower Street, E.C.3. (Demy 8vo, pp. 53. 1s. net.) (3) *Milk Competitions.* Published by the National Clean Milk Society (Incorptd.), 3, Bedford Square, W.C.1. (Medium 8vo, pp. 11. 1s. net.)

must be the introduction of reasonably sufficient water supplies where these have been deficient.

Farmers and their employees have not been distinguished by any special receptivity of new ideas, and the reader of Mr. Mattick's little treatise may speculate as to what a country cowkeeper who died twenty or thirty years ago would, if he could now revisit the earth, think of all the wonderful developments that have taken place since his departure. The terminology would confound him—bacteria, coliform bacilli, agar plates, Petri dishes, the counting of colonies, and so forth! Having puzzled and groaned over these, he would probably be glad to creep back into his coffin.

The very nature of the criteria by which success or failure in milk competitions is determined ought to commend them to all concerned. In judging a cow or a horse, and in awarding or withholding a prize, the individuality of the judges and their views about points of excellence may presumably vary, so that their verdict may not always be approved by the losers, or even by spectators. But in milk competitions there are accepted standards of value; tables in which the points to be allowed for every detail are published for general information, so that there should be much less room for difference of opinion than in the verdict of the referee at a boxing match which has not been decided by a knock-out. In milk competitions the score card system, introduced by the National Clean Milk Society, was expanded and adopted by the Local Government Board during the war, and is now well established and understood. In a total of 125 possible marks, which would be a "perfect score," a minimum number of colonies of bacteria per cubic centimetre counts 39, the absence of coliform bacilli 18. In food value fat is assessed at 29, solids not fat 8, flavour and odour 20, while the best figure for the absence of visible dirt is 6, and for the condition of the container 5. In this summation it is good to observe the place held by food value. The assessors have not been carried off their feet by the bacteriologists, but have thought of sustenance as well as of purity, so that the slimmest of dairymen cannot in this competition make purity a substitute for substance, whatever he may risk doing in his daily rounds. In this fashion the most modern of sciences has invaded the sphere of the morning milkman, and it is safe to say that the children of the country are reaping a daily benefit.

THE SCOTTISH BOARD OF HEALTH: A RETROGRADE STEP.

OUR review of the parliamentary session in last week's issue may be supplemented by some reference to a matter which is of considerable importance to the medical profession in Scotland. This was the introduction in the closing days of the session of the Reorganization of Offices (Scotland) Bill, which was ordered to be printed on July 30th. The Scottish Board of Health Act, 1919, provided for the appointment of a Parliamentary Under Secretary for Health and for the constitution of a Board of Health of six members, one of whom must be a registered medical practitioner. The bill now introduced proposes to abolish the former office and to appoint a Parliamentary Under Secretary for Scotland, and it proposes further to limit the number of members of the Board to three, and, most important of all, it abolishes altogether the qualifications of members. The result will be that health matters in Scotland will be administered by a Board none of the members of which need have any medical qualification, and instead of having a Parliamentary Under Secretary to deal solely with health Scotland is to have an official who will give only a portion of his time and attention to this most important duty. At the time of the creation of the Board of Health the Scottish Committee of the British Medical Association had a good deal of negotiation with the then Secretary for Scotland, and the above-mentioned points were conceded as a result of the representations made. Their withdrawal now comes near to being a breach of faith, and is certainly a rebuff to the profession and a lowering of the status of medical service. The Scottish Committee will no doubt protest, and will probably join with other bodies in doing so.

HUMAN WELFARE AND MODERN MEDICINE.

THE objects of the American Medical Association, like those of its elder sister, the British Medical Association, are the promotion of the science and art of medicine and the betterment of the public health; upon this text Dr. Ray Lyman Wilbur, of Leland Stanford University, California, president of the American Medical Association, delivered an eloquent address at its seventy-fourth annual meeting, held at San Francisco this summer. The history of the art and science of medicine, he said, had run more or less parallel with human advance. In general it had reflected the mental attitude of those it served. Medicine was as old as man. Its aims had always been the relief of human suffering and the release of human power from physical and mental handicaps. The individual and his life and happiness were basic factors in any scheme of human welfare. Methods changed, but the aims did not. They still revolved around the individual relation of a physician to his patient. The touch of sympathy and the need of personal helpfulness were as important as ever. The voluntary association of two men, one giving and the other seeking relief, was at the heart of the art of medicine. Laws must be so framed and so carried out that while the public welfare was protected this bond was not destroyed. The success of a race was dependent on the strong and the reproduction of the strong. In the control of the human germ-plasm lay man's future. Bringing science into medicine had brought a great flood of workers who lacked full medical training into the broad domains of physical health. They were appreciative of much of the science of medicine, but they lacked that deeper professional insight which came from medicine as an art. The general practitioner—that real disciple, interpreter, and practical exponent of medical science—had been pushed aside in many parts of America, but while the primary object of medical education was and must always be the training of medical men and women for the general practice of medicine, it must develop specialists also. At every step the teacher had a double function. He was the teacher, with all that the term implied, and the personal medical attendant of a fellow human being. If he failed in the second he was worse than a failure in the first. His real success as a physician depended largely on his capacity to view his patient as a social unit. He must combine treatment and prevention of disease. When every school child received some training in biology (Dr. Wilbur continued) the quack, the "patent medicine" cheat, the aggrandized rubber and manipulator, and the knotted string faddist would have a less fertile soil for their mushroom activities. Medicine, in its foundations and in its applications, was based on research. The most sacred heritage of medicine came through the transcendent genius of a comparatively few men. The protection and advancement of research was our greatest opportunity, but it was as important to apply the results of research as to foster it.

THE CAMBRIDGE CHAIR OF ANIMAL PATHOLOGY.

Early this year, as announced in these columns, the Senate of Cambridge University accepted an offer made by the Ministry of Agriculture and Fisheries of a capital sum of £30,000 to found a Chair of Animal Pathology. The Senate subsequently approved regulations for the professorship, fixing the stipend at £1,200 per annum, and defining the duties of the chair as the advancement of the knowledge of the diseases of animals by teaching and research. Mr. J. Basil Buxton, F.R.C.V.S., who holds the diploma of veterinary hygiene of the University of Liverpool, has now been elected to the chair. He is at present attached to the staff of the National Institute of Medical Research at Hampstead under the Medical Research Council, and has lately taken part in an investigation into the efficacy of the various tuberculin tests in cattle. Together with Professor T. B. Wood, F.R.S., Drapers Professor of Agriculture at Cambridge, he is a member of the Tuberculin Subcommittee of the Medical Research Council. On taking up his duties at Cambridge Professor Buxton will have his headquarters in an extension of the School of Agriculture adjoining the new biochemical laboratory which is being built and presented to the university for Professor Hopkins by Sir William Dunn's trustees. His first task will be to prepare plans for his headquarters laboratory at the School of Agriculture; for a branch laboratory, paddocks, animal houses, etc., at the field laboratories; and for staff and equipment. Although the regulations mention teaching among his duties, it is expected that at the beginning his whole time will be devoted to organization and research. The establishment of a Chair of Animal Pathology in the University of Cambridge, in direct contact with the School of Agriculture and with the hearty co-operation of the School of Medicine, is a departure of the greatest importance which will be watched with close interest by the medical profession.

ARC-LIGHT BATHS FOR TUBERCULOSIS.

Dr. J. G. Moyles, chairman of the Hospitals Committee of the Liverpool City Council, and Dr. C. Rundle, medical superintendent of the Fazakerley Sanatorium, have issued an interesting report on a recent visit to Copenhagen and Stockholm, to study the treatment of tuberculosis with arc-light or artificial sunlight baths. It is claimed for heliotherapy as carried out at Leysin, Switzerland, and for artificial sunlight produced by specially constructed carbon arc lights, that it produces a rapid improvement in the general health and nutrition, disappearance of pain and fever and return of appetite, repair of bone tissue and healing of sinuses and ulcers, a reduction in the size of tuberculous glands and in many cases their ultimate cure. There is no doubt that many such recoveries have taken place where the requisite amount of sunlight is obtainable. In those countries, as in the British Isles, where such conditions do not exist, carbon arc lights are employed, and in Copenhagen and in Stockholm such artificial sunlight has been extensively used in the treatment of all forms of tuberculosis. It would appear that the curative properties are present in the ultra-violet rays, and that the heat rays should be excluded. The carbon arc light is that generally used, and at a distance of one metre. Where the disease is not localized the back, chest, and flank are exposed, at first for thirty minutes; the period may be increased to a maximum of two and a half hours and the treatment applied daily. In lupus and tuberculous sinuses no dressings are worn during the exposure to the general light bath. The eyes of the patients are protected with large black spectacles. At Stockholm the effects of artificial sunlight were studied in cases of surgical tuberculosis. Dr. Henning Waldenström, the orthopaedic surgeon, expressed the opinion that surgical measures must continue to be our chief weapon, and that artificial sunlight occupied a position equivalent only to that of fresh air, good food, and tonics, and should be regarded as an important adjuvant to treatment. In discussing the treatment of tuberculous disease of the bones, the writers of the report draw attention to the fact that in the use of natural sunlight, as well as in that of artificial sunlight, complete immobilization of the affected parts is regarded as unnecessary. Cases of caries of the spine are kept only in the recumbent position when pain is present. They arrive at the following conclusions: (1) No injurious effects can result from a proper application of this treatment. (2) The immediate effect is one of exhilaration and a general feeling of well-being. (3) In certain surgical conditions the arc lamp effects a cure in conjunction with surgical measures more rapidly than when the latter alone are used. (4) The treatment is of value in tuberculosis of the larynx, so intractable often to other remedial measures. They are unable to assert that the arc lamp possesses a definite curative value in lung disease beyond those measures already known. In view of its beneficial action in certain types of tuberculosis the authors recommend the installation of one arc-light unit at the Fazakerley Sanatorium.

A NURSERY TRAINING SCHOOL.

Dr. Eric Pritchard contributes to *Country Life* of August 11th an interesting note on the Nursery Training School, Wellgarth Road, Hampstead Garden Suburb, to which he is honorary consulting physician. This institution was established twelve years ago in an East End slum; it moved to its present sylvan quarters in 1915. It was originally founded through the efforts of the Women's Industrial Council, the object being to open up a useful career to women. The girls who come to it as students on probation are drawn from all classes of society; most of them have received a good secondary education and some are the daughters of professional men. Great care is taken in choosing the students, for it is recognized how much little children depend for their own character and manners on the example and precept of those who look after them. As a rule, the girls or their parents pay the fees themselves in advance; but occasionally the fee is paid out of State grants or in the form of a scholarship. The period of training is one year, during which a student serves an apprenticeship in the nurseries, laundry, kindergarten, kitchen, and needle-room. She also attends lectures on mothercraft, elementary hygiene and physiology, and domestic economy, and she has opportunities of visiting the welfare centre in Marylebone. The aim of the committee and staff is to make the training as little like that of a hospital and as much like that of a well conducted nursery as possible. The buildings were designed to combine the maximum of open air and sunshine and isolation at a minimum of cost; the illustrations to Dr. Pritchard's article show how charmingly the architects have carried out the ideas of the committee. Two long open galleries, facing south, one above the other, run from end to end of the building. These galleries communicate with the outside, and with the nurseries and other rooms within, by means of hinged folding windows. Except in very cold weather, or when the children are being bathed or dressed, these folding panels remain open; each nursery is thus practically open on one side and looks out on to the garden and the fields beyond. The housework is done by the nurses themselves. Between twenty and thirty girls pass out of the school each year, ready to take charge of the children and nurseries of middle-class families.

THE LOOMIS SANATORIUM, NEW YORK.

The twenty-sixth annual report of the Loomis Sanatorium, New York, affords a comprehensive account of the year's work. Complete tables are given relating to the number of patients, their stage of disease, the complications encountered, the cause of death, their place of birth, their place of residence, their sex, age, occupation, social condition, religious denomination, and state on discharge, but no information as to the presence or absence of tubercle bacilli in the sputum, or of any specific treatment —such as artificial pneumothorax or tuberculin—which may have been adopted. Of the 199 patients considered 8 per cent. on admission were in the incipient stage of the disease, 50 per cent. in a moderately advanced stage, and 42 per cent. in a far advanced stage. Of these 3 per cent. were discharged arrested, 4 per cent. apparently arrested, 34 per cent. quiescent, 23 per cent. improved, and 20 per cent. unimproved; 16 per cent. dead. These results, however interesting in themselves, are hardly to be compared with such figures as those in the Adirondack or Midhurst reports, as the proportion of advanced cases is so very much higher in the Loomis Sanatorium, which, as is stated in the prospectus, is designed "for the care of tuberculous invalids presenting a fair prospect of recovery," not, as in the case of most sanatoriums, for the treatment of patients with incipient disease. Several pages of the report are devoted to a record of the patients treated since the foundation of the sanatorium in 1896, with tables showing the number of inquiries sent out, the number of replies received, and the state of health of those patients who are still living. As, however, no data are provided giving the number of patients who have died in the meantime, the value of the figures is small. It is of little interest, for example, to know that of the former patients reported to be alive, 85.45 per cent. are in a satisfactory condition of health, if we do not know at the same time what percentage of patients has survived at all. Attached to the sanatorium is a research laboratory in which work has been undertaken on problems connected with tuberculosis. It has been found that there is an inverse correlation between the blood lipase content of the patient and the excellency of the prognosis. Those cases with a low lipase content present but poor chances of recovery. More and more reliance is being placed upon the Roentgen rays, and especially on stereographic photography—a method, we believe, destined to play a part of increasing importance in the assessment of the extent of disease and of its alterations during the course of treatment. The report, as regards its production and illustration, upholds the best traditions of the Americans, and we would recommend it to all who are interested in the sanatorium treatment of tuberculosis.

INTERNATIONAL UNION AGAINST TUBERCULOSIS.

The Council of Directors of the International Union against Tuberculosis held its annual meeting in Paris on July 26th last, at the headquarters of the League of Red Cross Societies. Twenty members of the council from different countries met under the presidency of Dr. Dewez of Brussels. Professor Léon Bernard, Secretary-General of the Union, gave an account of the development of the Union since the Brussels conference. It was decided that the following questions should be placed on the agenda of the conference to be held at Lausanne in September, 1924: (1) What are the relations between pregnancy and tuberculosis? To be reported on by Professor Forssner (Stockholm). (2) Do there exist naturally or can there be produced artificially saprophytic forms of Koch's bacillus which might become virulent tuberculosis bacilli? Report by Professor Calmette (Paris). (3) What are the effects of the organization of the antituberculosis campaign in different countries on the decrease in tuberculosis mortality? Report by Sir Robert Philip (Edinburgh). During the recent meeting in Paris a report by Professor Besançon on the respective value of techniques for research of Koch's bacillus for diagnosis of lesions in human tuberculosis gave rise to an interesting discussion. This report will appear in the next number of the *Bulletin* of the International Union against Tuberculosis.

NARCOTIC ADDICTION IN EGYPT.

The introductory note to the Annual Report of the Egyptian Department of Public Health for 1921[1] states that during the past few years there has been evidence of a progressive and serious increase in the number of persons in that country who are gradually becoming addicted to the habitual use of narcotic and stupefacient drugs. This appears to be particularly the case in regard to cocaine, and proposals have been put forward by the public health authorities for dealing with the evil. As a first step in this direction it has been considered advisable to institute a more stringent control over the importation and exportation of narcotic drugs. Legal enactments have been drafted and are now under consideration prohibiting all importation and exportation of drugs of this nature, except by special licence for each consignment, which will only be granted when the health authorities have satisfied themselves that such drugs are required for legitimate medicinal purposes. This, together with certain readjustments of the measures of control over the internal traffic in these drugs, will, it is hoped, do something to improve the position. The whole question can, however, only be dealt with adequately when the political and other circumstances of Egypt permit of the enactment of laws, applicable equally to foreigners and natives, which will provide a sufficiently deterrent punishment for illicit trafficking in narcotics. During the year under review a non-Egyptian doctor was deported for abusing his privileged position to facilitate traffic in cocaine.

THE MEDICAL REGISTER: UNTRACEABLE PRACTITIONERS.

We publish in the Supplement this week (pp. 110-111), at the request of the Registrar of the General Medical Council, a list of the names of those medical practitioners who have not replied to his inquiries as to the accuracy of their addresses. The list now published includes all untraceable names from H to O in the body of the *Medical Register*, as it is only this section that has come under review in the present year; since it was prepared many further inquiries have been made by the Registrar. Any medical practitioner who finds his or her name included in this list should communicate at once with the Registrar of the General Medical Council, 44, Hallam Street, Portland Place, London, W.1.

We much regret to learn of the death, on August 10th, of George Edward Rennie, M.D., F.R.C.P., physician to the Royal Prince Alfred Hospital, Sydney. Dr. Rennie was at one time Editor of the *Australian Medical Gazette*, and for some years was a valued contributor to our columns. We hope to publish an obituary notice in a future issue.

[1] Government Publications Office, Cairo, 1923, price P.T. 20.

The usual half-yearly indexes to the Journal and to the Supplement and Epitome are now published; they will be issued only to those readers who ask for them. Any member or subscriber who desires to have one or all of the indexes can obtain what he wants, post free, by sending a post-card notifying his desire to the Financial Secretary and Business Manager, British Medical Association, 429, Strand, W.C.2.

BACTERIOLOGY OF CONDENSED MILK.

THE Food Investigation Board has issued a report by Dr. W. G. Savage and Mr. R. F. Hunwicke on condensed milk.[1] It consists of two parts, the first being on sweetened condensed milk and the second on unsweetened, each part representing the results of a separate inquiry.

In an introductory note the Chairman of the Board, Mr. W. B. Hardy, F.R.S., points out that one of the difficulties attaching to the high nutritive qualities of milk is that bacteria and yeasts are able to grow freely in it. As an industrial product, therefore, the utmost circumspection and skill are called for on the part of those who handle it, whether their task be its distribution in the fresh state or the preparation of the canned form. The difficulty of the manufacturer lies in the fact, not peculiar to milk but common to all decomposable foodstuffs, that the process of sterilization if pushed to finality alters the product and may impair its more subtle nutritive properties. He has, therefore, to control the milk from the first so as to keep the bacterial content as low as possible, and to confine his methods of sterilization within certain narrow limits imposed by the chemical instability of milk itself and by the necessity for the destruction of practically all the micro-organisms present. The report naturally concentrates attention upon failures and the causes of failure. Nevertheless, though condensed milk as marketed is rarely sterile in the strict bacteriological sense, the methods of manufacture in up-to-date factories are such as to reduce the number of intrusive organisms to harmless limits.

I. SWEETENED CONDENSED MILK.

Two main varieties of sweetened condensed milk are produced commercially, the full cream and the machine skimmed—differing in the fact that the former consists of concentrated whole milk, whereas in the latter practically all the fat has been removed. The trade in full cream sweetened condensed milk is large and increasing; hundreds of tons are imported annually and there are also many factories in this country.

Methods of Manufacture.

The following are the essential details of the usual methods of manufacture:

> Factories are situated near milk producing districts, and the milk, when received, is weighed or measured and either passed into a large tank in which it is heated, or through a flash pasteurizer. The maximum temperature reached is ordinarily between 80° and 90° C., at which it is retained for a few moments. Bacteriologically the point of importance is that the temperature is insufficient to kill many types of bacteria and cannot be relied on for this purpose. After heating the milk, sugar is added, either by mixing direct with milk or by running in concentrated solution which has been boiled. The sweetened liquid now passes into vacuum pans from which the air has been partially exhausted so that the milk boils at a low temperature, about 50° to 60° C. The time taken to evaporate each batch of milk to a suitable consistency is about three hours, the condition being estimated from samples withdrawn periodically and examined for viscosity, or by the hydrometer. The evaporated milk is emptied into cooling vessels and then transferred to tins by machines which deliver a fixed quantity to each tin. The tops are placed on by hand and fixed in position by a machine. The tins of condensed milk are not stored but placed on the market at once.

Though the milk is obtained from the vicinity, and therefore fresh, it is not necessarily clean and commonly contains large numbers of bacteria and a good deal of dirt. Most non-sporing bacteria are killed by the preliminary heating, but the milk may easily be infected from the pipes conveying the condensed milk to the tins, and the ordinary method of cleaning these with live steam is inadequate. Bacterial infection is often attributed by the manufacturers to the sugar, but if stored dry it probably does not introduce many organisms when added to the milk. The air of the factory, disturbed by the constant traffic of the workers, has been shown to be heavily charged with yeasts and large numbers of bacteria and the method of cooling the milk in vessels with open tops invites aerial contamination. Commonly these cooling rooms, instead of being set apart, are found in the middle of a factory, in the line of ordinary traffic. The cooling vessels ought to be placed well above the ground and the floor kept thoroughly wet; overalls should be worn by those who work in the room. The tin receptacles for the milk are not usually sterilized before being filled, and if not made on the premises may be dusty.

Methods of Inspection.

On arrival from abroad tins of condensed milk are inspected for bulging, leaking, excessive rust, or mishandling of tins; the majority of tins rejected are so dealt with because definitely "blown." Suspicion attaches also to a springy condition or evidence of pressure detected by the feel of the can. The judgement of the food inspectors was confirmed by laboratory tests in 87 per cent. of the tins. The difficulty of correct judgement arises chiefly in connexion with tins which are "springy" but which do not show any sign of gas; some are unfit but more are sound.

Bacteriology of Sweetened Condensed Milk.

The report records the bacteriological analysis of thirty-three rejected samples which were "blown" and showed definite evidence of pressure. Yeasts were found in 30 tins, gas-producing aerobes and yeasts in 5, true gas-producing anaerobes in 1, no yeasts or gas-producing bacilli in 2. Thus yeasts were present in 91 per cent., and the evidence demonstrates that the unsound condition is commonly due to yeasts, although yeasts are frequently met with also in sound tins. Examination of tins rejected although not definitely blown showed in some cases yeasts, bacilli and cocci, but the tins were mostly old or slightly defective and there did not appear to be any definite bacterial cause to account for the condition.

Types of Organisms Isolated from Sweetened Condensed Milk.

Sweetened condensed milk is never sterile. Yeasts, moulds, micrococci, anaerobes, gas-producing aerobic bacilli, sporing aerobic bacilli, thermophilic bacteria, and other aerobic organisms are often present. Micrococci are present in every sample of sweetened condensed milk and many are heat resistant, having survived the heating given to the milk before condensation. The chief types are staphylococci, streptococci, and diplococci, capable of multiplying in the condensed sweetened milk. They may be derived from the original milk or represent contamination during the manipulations. The anaerobes isolated did not decompose the sweetened condensed milk. This is not to be attributed to the presence of saccharose, since they behaved similarly in unsweetened condensed milk, but is due to physical changes consequent on concentration which make the final product an unsuitable medium for growth. The gas-producing aerobes isolated were all of the *B. coli* type but were unimportant as causes of decomposition. *B. coli* strains are not inhibited by the percentage of saccharose present, but they will not grow and ultimately die out in sweetened condensed milk, which, either from its viscid nature or from some other cause, is a medium unfavourable to their growth and vitality. Sporing aerobic bacilli were isolated from 92 per cent. of all tins examined and are almost universally present in sweetened condensed milk even when perfectly sound. While probably not a direct cause of tins becoming blown they may cause decomposition changes in milk, for their ability to liquefy blood serum and peptonize milk shows they are capable of decomposing proteins and are, therefore, potential causes of decomposition of milk; 40 per cent. saccharose is probably inhibitory to some extent, but the concentration of the milk is of more importance since even in unsweetened milk under aerobic conditions these sporing aerobes can multiply and produce acid, but they do not peptonize or even clot the condensed milk. The process of concentration of the milk has so altered its condition that the milk is no longer clotted or peptonized. As a cause of decomposition or of other abnormal changes in the milk, they seem to play either a negative, or at most a very insignificant, part. Possibly acting symbiotically with diplococci they may produce changes which neither strain could accomplish by

[1] Department of Scientific and Industrial Research. Food Investigation Board. Special Report, No. 13. Studies in Sweetened and Unsweetened (Evaporated) Condensed Milk. By W. G. Savage, M.D., B.Sc., and R. F. Hunwicke, B.Sc., A.I.C. H.M. Stationery Office. 4s. net.

itself. Thermophilic bacteria are widely distributed in condensed milk, both good and bad. They probably represent survivals from the original milk. Since none produce any gas they are not a cause of tins becoming blown.

Significance of Yeasts.

Yeasts are constantly present in sweetened condensed milk and the "blowing" of tins is invariably due to the growth and chemical activities of yeasts. A higher proportion of yeasts was found in freshly canned factory samples than in shop samples. Many different types may be present, but from the practical point of view the important points are the ability to ferment sugars and to grow in strong solutions of saccharose. Rejected blown tins almost invariably contained yeasts of the fermenting type, and such organisms were found to produce gas when inoculated into sound tins. But the mere presence of yeasts, even of the fermenting type, will not necessarily result in fermentation and unsound tins. Another factor is of primary importance—namely, the ability to multiply sufficiently in sweetened condensed milk under the conditions of anaerobiosis which prevail. Experiments showed that yeasts do not readily multiply in sweetened condensed milk. This is not due to the high percentage of saccharose, since this is not inhibitory to them—it is due in part to the fact that condensed milk is a medium not very suitable to their growth, but chiefly to the restricted supply of oxygen. In tins of condensed milk the supply of oxygen available is very limited and soon becomes exhausted. If yeasts are present in sufficient numbers, or if they can multiply sufficiently with the little oxygen available, they will be able to produce enough enzymes to break down the saccharose and produce gas. If, therefore, only a few fermenting yeasts gain access they are unlikely to produce gas and cause the tin to become blown, because they will not increase sufficiently before anaerobic conditions become established in the tin and cause their multiplication to cease. Probably in such conditions they gradually die out and this is the explanation why so few shop samples contain living yeasts.

The yeasts may be derived from the original milk, the added sugar, the air of the factory, or a deposit in the pipes beyond the vacuum pans. After the milk has been pasteurized it is never again heated to a temperature high enough to ensure destruction of yeast cells.

Changes which occur on Keeping.

While all fresh samples of sweetened condensed milk contain living bacteria, the combined conditions of a comparatively unsuitable medium and the absence of oxygen are so unfavourable to multiplication that the general tendency is for a decrease rather than an increase to take place in the initial number of bacteria. Should oxygen become available a material increase invariably takes place. This is of importance from the point of view of infant feeding, since tins of sweetened condensed milk contain more milk than is consumed by an infant in several days, especially if used, as so often is the case, as a supplementary source of food. Although the initial bacterial content may be low the mere fact of opening, quite apart from any bacterial additions from outside, induces a vast increase of the bacteria already there. The increase is mainly of micrococci, which may be perfectly harmless, but the group includes many pathogenic streptococci, and it is not justifiable to assume that the vulnerable infant intestinal tract may not be damaged or that fatal infection may not result from their admission. Sweetened condensed milk, if used for infant feeding at all, should only be put up in tins small enough to contain one day's supply. The darkening in colour of sweetened condensed milk which takes place with time is probably due to the caramelizing of some of the saccharose and has no relation to bacterial action. The alteration in consistence which is shown by the milk becoming more thick and viscous is due to the same general physical changes as occur in colloids generally, and are spoken of under the term "ageing of colloids." It is not dependent on bacterial action.

Practical Considerations.

There is no suggestion that the fermenting yeasts which produce unsoundness of tins are harmful to the human body; the contents are merely unsaleable, but may be used for confectionery after proper boiling. The essential requirements to prevent unsoundness are that the heating before condensation shall be sufficient to kill yeasts; that in cooling aerial contamination is avoided; that the pipes conveying condensed milk are unscrewed and cleaned with hot soda water each day; that the milk is canned as soon as possible; and that only airtight tins are used. Each batch of tins ought to be kept in a warm special room for several weeks before being released for distribution.

Although no hard and fast bacteriological standard is possible, the report states that the presence of lactose fermenters of the *B. coli* type or of fermenting yeasts in 0.5 gram or less suggests unsatisfactory conditions which might fittingly warrant the rejection of an individual tin and would serve to direct attention to the methods of manufacture with a view to their critical inspection.

II. Unsweetened Condensed Milk.

Methods of Manufacture.

The essential features of the methods of manufacture of unsweetened condensed milk are that fresh cow's milk is evaporated in a partial vacuum till reduced to rather less than half its bulk; it is then run into tins, sealed down, and kept from decomposition by sterilization in the tin.

Nothing is added and water is the only constituent removed. The milk must be fresh, for if the acidity of the evaporated milk is much above normal the subsequent sterilization may cause it to clot and become unsaleable. Before condensation the milk is often pasteurized or boiled to prevent further bacterial growth and increase of acidity, and to allow the milk to be supplied hot to the vacuum pans. During condensation the milk is boiled under reduced pressure until the desired consistence is reached, then cooled and passed into tanks from which the evaporated milk is passed to filling machines which automatically deliver the requisite quantity to each can. The tops are put on by hand and rendered airtight by a machine. The sealed tins are then placed in retorts and heated to temperatures of 110° to 116° C. for thirty to forty minutes. Heat penetration is facilitated if the tins are rotated during sterilization. They are cooled rapidly by the admission of water to the retorts. Processed tins are usually stored for several weeks and passed for labelling and marketing only after careful examination.

Methods of Trade Examination and their Reliability.

The methods of trade examination used are similar to those employed for other classes of canned food, attention being directed chiefly to visible evidence of bulging and the sound produced on shaking. If the contents are liquid the sound will indicate this: if milk is partially or wholly clotted it gives a different sound. The results of laboratory tests recorded in this report showed a fairly close correspondence between external physical defects and the condition of the contents. The present methods of examination are satisfactory and reliable, and the opening of a few tins will usually clear up any doubtful points.

Bacteriology of Unsweetened Condensed Milk.

Examination of sound shop and factory samples showed about 80 per cent. sterile: the non-sterile tins contained chiefly spore-bearing aerobes in small numbers, but there was no evidence that the contents were decomposing.

Examination of 47 samples rejected either because blown or contents clotted showed 9 sterile, micrococci only in 16, definite gas-producing bacilli in 6, coccoidal bacilli in 5, gas-producing yeasts in 1, anaerobes in 4, other bacteria in 7.

Sporing aerobes are probably never a cause of gas production and very rarely of unsoundness of contents. The colloidal changes resultant upon concentration and sterilization materially alter the milk, so that while sporing aerobes can multiply in it they do not do so very readily and do not clot or peptonize. When present in small numbers as spores they do not usually multiply but remain comparatively harmless. Similarly with anaerobes—if spores of anaerobes alone are present they do not necessarily multiply or cause any changes in milk, but if they can increase they will decompose the contents.

Probably the presence of other organisms is of assistance to anaerobes. Gas-forming aerobic bacilli were not found in any sound samples. *B. coli* and *B. cloacae* can grow in and decompose unsweetened milk, causing the tins to become blown and the contents clotted. These organisms are therefore a definite cause of unsoundness and gas development in unsweetened milk tins. Yeasts are rarely present. Non-fermenting yeasts are of no consequence, but fermenting types may cause blowing of tins. Thermophilic bacteria are rarely present and of no significance. Micrococci may cause acid, clotting, and gas production. Coccoidal bacilli (small, capsulated, non-motile, non-sporing Gram-positive bacilli) are

capable of producing gas and causing blown tins. In the 47 rejected samples of unsweetened condensed milk examined the causes of unsoundness were sporing anaerobes in 3, micrococci in 18, coccoidal bacilli in 5, yeasts in 1, gas-producing aerobic bacilli in 6.

Practical Considerations.

It is pointed out that the changes resulting from concentration are profound and not merely caused by deprivation of water. The milk is so altered that it becomes less suitable for bacterial multiplication. It is doubtful whether the temperature during the process is capable of ensuring a sterile product in every case. What is obtained is not a milk uniformly sterile but one which leaves a variable percentage of tins containing living organisms. In view of the fact that comparatively little differences in the temperature of sterilization and slight changes in acidity may yield a coagulated useless product, the tendency is for manufacturers to under- rather than over-process the milk. Since decomposition is nearly always due to non-sporing types the manufacturer has essentially to guard against the survival of non-sporing bacteria, especially more resistant types of micrococci, and against admission of air through minute leaks which may enable dormant forms to multiply and cause decomposition changes.

STATISTICS OF ANTIRABIC INOCULATIONS IN INDIA.

LIEUT.-COLONEL J. W. CORNWALL, M.D., I.M.S., of the Pasteur Institute of Southern India, Coonoor, Madras, has presented to the Congress in Strasbourg a statement as follows, giving the statistics of the results of antirabic inoculations carried out at the Institute.

The majority of the patients have been given the following treatment: 1 per cent. fixed virus suspension in 0.85 per cent. NaCl with 0.5 per cent. phenol. Each person receives 5 c.cm. once daily for fourteen days, injected subcutaneously over the abdomen, 2½ c.cm. on each side.

The Institute has been working for sixteen years and 28,898 persons have received the full treatment mentioned above:

Total number treated: 28,898.		
Died during treatment	45 =	0.15 per cent.
Died less than fifteen days after the completion of treatment	78 =	0.27 per cent.
Died more than fifteen days after the completion of treatment ...	200 =	0.70 per cent.
Total mortality	323 =	1.11 per cent.
Percentages of failures		0.7

In Madras the bite was inflicted in most instances by dogs (95.4 per cent.), and only rarely by jackals (2.7 per cent.). In other parts of India the proportions are different, a much larger number being inflicted by jackals.

The Infectivity of Rabid Dogs.

Certain dogs, proved rabid by laboratory tests, have bitten many people without infecting any of them. Other dogs, also proved rabid by laboratory tests, have infected the majority of the people whom they bit. Probably different strains of the virus of rabies differ in infectivity.

When the criterion of the infectivity of the biting animal is the death from hydrophobia of one of the persons bitten, the risk run by the other persons bitten by the same animal who have received no treatment can be estimated. A number of such instances has been collected by the Pasteur Institute of Southern India. The bitten persons had received no treatment:

Number of persons bitten	423
Deaths from hydrophobia	148
Mortality per cent.	35

So it may be concluded that in Southern India about 35 per cent. of persons bitten by rabid dogs which are actually infective will, if untreated, develop hydrophobia and die. No account is taken in this estimate of the position, number, or severity of the bites inflicted.

The Influence of Prophylactic Treatment.

The influence of prophylactic treatment in preventing the onset of hydrophobia can be estimated only by collecting a long series of similar groups of persons bitten by rabid dogs, the infectivity of each dog being proved by the death from hydrophobia of at least one of the persons bitten by it. If some of the persons in each group receive preventive treatment and some do not, the value of the treatment can be estimated.

A less accurate but still a useful way of arriving at a valuation of antirabic inoculation is to take only those instances in which a presumably rabid dog has bitten several persons of whom some accept the treatment and some refuse. Both the treated and the untreated are kept under observation for a period of months. The treatment given at the Pasteur Institute of Southern India when thus investigated over a number of years shows the following result:

Number of persons observed	2,174
Treated	812
Deaths among treated	2.9 per cent.
Untreated	1,362
Deaths among untreated	6.2 per cent.

So we may conclude that our treatment saves one out of every two persons who would otherwise have developed hydrophobia and died.

The ordinary statistics published by Pasteur Institutes cannot be used for estimating the value of preventive antirabic treatment.

ROYAL MEDICAL BENEVOLENT FUND.

AT the last two meetings of the Committee sixty-one cases were considered and £547 18s. voted to thirty-nine applicants. The following is a summary of some of the cases relieved:

Daughters, aged 51 and 46, of M.D.St. Andrews who died in 1871. Through the death of a brother, whose pension ceased at his death, they expect that their income will not exceed £30 per annum each. The elder sister received £30 from sewing and the younger £20 as a journalist. Voted £20.

Daughter, aged 54, of M.R.C.S.Eng., 1863, who died in 1871. Applicant was a school nurse, but is now suffering from familial degeneration of the cerebellum. Her brother will allow her 5s. a week and friends have given her £5. She received board and lodging in return for light household duties. Voted £18 in twelve instalments.

Widow, aged 63, of M.R.C.S. who died in 1920, has only earned £40 during the last twelve months. She has had an offer to go abroad to look after some children but has not the means to go. Voted £5.

Widow, aged 49, of M.R.C.S. who died in 1910. A brother-in-law who has helped the applicant to the extent of £15 per annum is unable to continue this assistance. This money was used to pay the eldest daughter's travelling expenses to and from school, and the applicant asks the fund for a grant for this purpose. Voted £10 in two instalments.

Daughter, aged 41, of M.R.C.S., L.R.C.P. who died in 1913, is now in a sanatorium and asks the Fund to help with maintenance. Her father died leaving a bankrupt estate. Voted £18 18s. for sanatorium treatment.

Widow, aged 64, of M.D.St. And., F.R.C.S.Eng. who died in 1899. Applicant has a little house property which brings in about 33s. a week. She has been suffering from diabetes for years, and is now in hospital under treatment at £1 1s. a week. Voted £10.

Widow, aged 74, of L.S.A., L.R.C.P. who died after a short illness in February last. House and furniture had to be sold, and after mortgage had been paid and all expenses applicant estimates that her income will not exceed £35 per annum. At present her board and lodging costs 35s. a week. Voted £18 in twelve instalments.

Widow, aged 53, of M.B.Lond. who died in 1912. Applicant, owing to physical inability, is unable to do private nursing continually. She has maintained and educated her daughter and is now hoping that her daughter will be able to secure a post. Voted £10 in two instalments.

Subscriptions may be sent to the Honorary Treasurer, Sir Charters Symonds, K.B.E., M.S., F.R.C.S., at 11, Chandos Street, Cavendish Square, London, W.1.

The Royal Medical Benevolent Fund Guild receives many applications for coats and skirts for ladies and girls holding secretarial posts, and suits for boys. The Guild appeals for second-hand clothes and household articles for the benefit of the widows and children who in happier times would not have needed assistance. The gifts should be sent to the Secretary of the Guild, 43, Bolsover Street, W.1.

THE Dyestuffs Advisory Licensing Committee of the Board of Trade had before it during July 395 applications for licences to import drugs and dyestuffs; 70 of the applicants were referred to British makers of similar products and 50 to reparation supplies available. Licences were granted to 246 applicants.

England and Wales.

Maternity Departments in Manchester.

A clinical report of the Maternity Department of the St. Mary's Hospitals, Manchester, for 1921 has been prepared by Dr. John W. Bride, the honorary assistant obstetric surgeon and registrar, and Mr. Frank S. Horrocks, M.B., Ch.B., the resident obstetric officer.

It appears that the total number of cases treated by the hospitals during the year was 2,990; of these 1,446 were treated in their own homes; the number treated in the wards was 1,544, a decrease of 216 on the preceding year; owing to an epidemic of scarlet fever in the early part of the year the hospital was closed for a month on the advice of the local authority. All cases, whether normal or abnormal, in the district are seen by the medical officers. It does not state whether the early examinations are carried out in the homes of the patients or whether ante-natal clinics are held which the patients are invited to attend. The maternal mortality for the 1,544 patients admitted was 45 (2.9 per cent.). The hospital admits serious cases from outlying districts and no one is refused if room can be made. Many of the cases are sent in by practitioners after attempts at delivery have failed. The maternal morbidity was 97 (6.3 per cent.). The standard adopted for the estimation of morbidity is as follows:

> A rise of temperature (during the first eight days of the puerperium) exceeding 100° occurring twice within 24 hours, irrespective of the pulse rate, and excluding the first 24 hours after delivery.

Among the 1,544 cases admitted there were 17 cases of twins, 37 occipito-posterior positions, 42 breech presentations, 28 transverse, 24 prolapse or presentation of funis, and 13 brow and face; abortions complete and incomplete numbered 276, and there were 4 cases of hydatidiform mole. There were 43 cases of placenta praevia, 2 mothers died and 26 children were stillborn; there were 27 cases of accidental haemorrhage, one only of the concealed type; 19 of the children were stillborn; there were 8 cases of severe *post-partum* haemorrhage, with 3 maternal deaths. Out of 119 cases of contracted pelvis treated in the hospital 4 were delivered by forceps, 7 by craniotomy, 99 by Caesarean section, and in 9 cases labour was induced. Of the cases in which Caesarean section was performed 9 were sterilized. Thirty-seven cases of eclampsia were admitted; of these 11 died. Twenty-three cases of ectopic pregnancy were operated upon and all made good recoveries. The deaths among children in the hospital, including premature children, numbered 216; of these, 95 full-term children and 90 premature were born dead; the remainder died after birth.

A considerable amount of teaching is given at the hospital; during the year 81 students, 11 post-graduates, and 67 pupil midwives attended.

The Minister of Health at Stoke.

The Right Hon. Neville Chamberlain, M.P., Minister of Health, visited Stoke-on-Trent on July 28th, when he opened the new cubicle block of the Bucknall Isolation Hospital, which is the first stage in the development of a large scheme of additions to that institution. Mr. Dale, the Chairman of the Joint Hospital Board, said that Mr. Chamberlain had one advantage which was not generally possessed, he believed, by heads of Government departments: he had had previous experience of the work he was now called upon to administer. He had been chairman of the Housing and Planning Committee of Birmingham City Council, and he was a member of its Health Committee until he became Lord Mayor in 1915. Since that time he had presided over the housing inquiry, which had important results. Mr. Chamberlain said that even if the Minister of Health had ten times his present staff he would still have to rely for the efficiency of the work he was called upon to administer upon the energy, vigour, and public spirit of the local authorities. What they could do at the centre was to gather together the threads from the different parts of the country, and they could place at the disposal of the local authorities the results of the work of the best scientific men in the country; but for the real hard work, for the efficient administration of the details of the actual labours which produced the results, they had to look to the local authorities and the officers who worked under them. He had always thought that one of the glories of this country was the system of local government. He sometimes wondered whether, with the complexity of local work and the growing demands upon those who were engaged on it, they would be able to go on getting men so willing to give up their time and leisure to them. He thought there was a serious danger in that respect, but he was encouraged by the appearance on every hand of new recruits in the ladies, who were anxious and ready to put their services at the disposal of their own towns. He ventured to say that there was no work for which women were better fitted than this work of health administration.

The General Infirmary at Leeds.

Though it is some time since the annual meeting of the General Infirmary took place, no note has appeared of that occasion in these columns, but as some important business was dealt with a brief reference may be made to the event. This was the second annual meeting presided over by the new chairman, Mr. T. L. Taylor, who has thrown himself into his new duties with great energy and enthusiasm.

The number of patients treated within the walls of the infirmary during the year 1922 was 575 more than during the previous year. Some few more beds and cots had been available during a part of the year, and with the opening of the Princess Mary ward for infants the accommodation which this provided was available for some months of the year. It may be mentioned that the opening during the present year of the remaining large ward, which, as was mentioned in this column on August 11th, is for sick children, will probably result in a still larger number of patients being dealt with during 1923. In all 10,277 patients were dealt with in the wards, of whom 492 had been carried on from 1921. It is interesting to note that the number of accident cases was smaller than in 1921, which was probably due to there being less trade, but which, it may reasonably be hoped, may be the expression of greater precautions on the part of employers and greater care on the part of the workmen. The newly formed orthopaedic department dealt with 428 in-patients, and shows signs of further development. In the out-patient departments a still greater increase seems to have taken place, not so much indeed in the number of out-patients, but in the number of attendances. The number of out-patients is lessened in respect of the transference of the extern maternity department to the maternity hospital, and the number of new cases in the venereal department has fallen from 1,804 to 1,336. An important event during the year was the opening of the Princess Mary ward on October 22nd, 1922. The ceremony was performed by the Princess, who was accompanied by Viscount Lascelles and by the Earl and Countess of Harewood.

The financial condition of the infirmary continues to cause much anxiety to the board of management, and some reference was made to this in the chairman's speech. The deficiency on the working of the year amounted to £20,977. At the end of the year the overdraft due to the bank was, on the general account, £43,418, and on the King Edward Memorial Extension account £11,121, making in all the very serious liability of £54,539. These figures were faced with courage and with a well founded hope by the chairman. From all sources of ordinary income the amount was practically the same as in the former year, and the expenditure had been in many particulars lessened without any impairment of efficiency. After referring to the excellent work of the Workpeople's Hospital Fund, Mr. Taylor spoke of the scheme which had been worked out by Mr. Braime, a member of the board, under which the employers of labour are to contribute a definite sum in proportion to the number of their employees. This scheme has every promise of success; it is under the immediate supervision of Colonel Burdett, who is steadily adding to the number of employers who are associating themselves with the scheme. The claims of the infirmary were also brought before the

West Yorkshire Coalowners' Association, and were sympathetically received. Mr. Braime also has a scheme in hand for approaching the professional and business classes of the community, and this, it is confidently expected, will bring in a large sum annually. Referring to the prospect of the opening of the remaining large ward, which, as has been mentioned above, has now been carried out, Mr. Taylor told the meeting that this would involve an annual expenditure of at least £5,000. He also referred to the pressing necessity for greater accommodation for nurses, whose numbers tended to increase year by year, not only in connexion with the number of patients, but with the increasingly serious nature of the cases and with the development of the work. Though it did not come within the business at the annual meeting, it may be mentioned that at the last meeting of the board estimates were accepted for an extension of the nurses' home at a cost of some £12,500. This extension will provide more bedrooms, and also make more adequate accommodation for the training school. During the present year a bazaar was organized by the nurses and sisters at the infirmary, and realized the sum of upwards of £3,000. No more eloquent appeal could be made to the public than this most timely and unselfish effort.

Scotland.

MEDICAL ATTENDANCE IN RURAL DISTRICTS.

THE annual conference of the National Federation of Rural Approved Societies was held last week in the Royal Arch Hall, Queen Street, Edinburgh. A number of questions affecting the health of rural communities and village life generally were discussed and an address was delivered to the delegates by Sir James Leishman of the Scottish Board of Health. Sir J. Athelstane Baines, who presided, said that there was a community of feeling in villages, and they must remember that, from the point of view of insurance, neighbourliness tended to a certain laxity of administration. Thus, there might be an occasional tendency on the part of a doctor to keep a patient rather longer on the list than was necessary. The administration of benefit was undoubtedly less strict in the villages than in the towns. Mr. James Falconer, M.P., in moving the adoption of the annual report, congratulated the Federation upon the work it was doing. In regard to the question of unemployment insurance, he said that in Scotland they were out and out opposed to any attempt to bring the rural workers under the present Unemployment Insurance Act. It would be a tax levied on the rural workers of Scotland for which they would receive practically no benefit at all. Continuing, he said that the approved societies had received a definite pledge that they would be consulted before terms were arranged with the doctors. He thought the Insurance Act was a good friend of the doctors. The doctors, as a whole, were doing their work very well; and it was as much in the interests of the doctors, whose reputation as a profession stood very high, to have unreliable certification stamped out as it was in the interests of the societies. Sir James Leishman said they were faced with many industrial, economic, and financial problems, but the Insurance Act had stood not only the stress of this period, but also the terrible test of the war in a way that had surprised a large number of people. The medical referee system had been entirely satisfactory. Of 32,000 doubtful cases disposed of, 45 per cent. were found incapable of work and 55 per cent. were found capable and went back to work. He took it that there would be no increase in contributions and no extra grants, and if there were any proposals to find more money the societies would have to find the money themselves. The sum of 9s. 6d. for capitation fee, *plus* 6d. for Insurance Committee administration, would stand in the Act at the end of this year. He understood that the doctors were asking for a capitation fee of from 10s. 5d. to 10s. 9d., and the question would have to be faced before long. The vast majority of medical men were rendering good and efficient service; and, according to his information, the men out in scattered rural areas had given, on the whole, better service than the town men, and the country practitioner deserved a little better treatment than the men in the towns.

A REFORMED LOCAL HEALTH AUTHORITY.

The Scottish Board of Health's Consultative Council on local health administration and general health questions has submitted to the Board a report on a reformed local authority for health and public assistance. Unfortunately the chairman of the council, Sir Thomas Munro, county clerk of Lanarkshire, well known for the vast amount of public service he had done in Scotland, has recently died. The council had nineteen members, and the thorny nature of the subject is shown by the fact that five of the nineteen have found it necessary either to make reservations or to dissent from the report. There is little or no question about the need for reform; the difficulty is to get anything serious done where so many diverse views are held, so many interests affected, and local sentiment is so strong, at the same time that Parliament has so much other work to do. There are no less than 201 self-governing burghs in Scotland, 19 of them with a population under 1,000 and 108 more with a population under 5,000. Obviously such areas cannot individually provide the public health services required, in respect, for example, of water, drainage, infectious disease, hospitals, sanatoriums, and expert staffs, at the same time that the difficulties of combination are often insurmountable, especially where financial jealousies are concerned. The reform proposed is sweeping. The town councils of burghs with a population of 50,000 and over should be the public health authority; for the county area the county council containing representatives appointed by the town councils of burghs with less than 50,000 should be the local health authority. This would leave seven municipal authorities and thirty-three county councils. Apart from vested interests, probably the great majority of public health officers will agree that this small number is far better than the present absurd multiplicity, but it seems doubtful whether a bill to give effect to these proposals has much chance to become law, looking to all the influences which would be ranged against it. Perhaps the report, however, may have the effect of leading to some measure of much needed reform.

EDINBURGH HOSPITAL STAFF CHANGES.

On his relinquishment of the charge of wards in the Royal Infirmary, Edinburgh, the managers of that institution last week appointed Sir David Wallace, K.B.E., C.M.G., to be one of its consulting surgeons, and on the motion of Dr. George Mackay placed on record their very high appreciation of his services to the institution. Mr. W. J. Stuart has been appointed one of the surgeons-in-ordinary to the Royal Infirmary and Mr. W. Q. Wood one of the assistant surgeons. The Directors of Chalmers Hospital have appointed Mr. Norman M. Dott assistant surgeon to that institution in room of Mr. W. Q. Wood. The Medical Committee of the Church of Scotland Deaconess Hospital has appointed Mr. J. M. Graham surgeon to the Deaconess Hospital, in room of Mr. W. J. Stuart, appointed to the Royal Infirmary, and Mr. Norman M. Dott assistant surgeon.

Ireland.

UNIVERSITY ELECTIONS IN THE NEW DAIL.

A MEETING of graduates of the National University, Ireland, adopted as candidates for the representation of the University in the new Dail, Mr. Michael Hayes, M.A., Professor John MacNeill, D.Litt., and Professor William Magennis. A committee to secure the election of these candidates was appointed and in the course of an appeal on behalf of the candidates has stated: Under present conditions stability of government and public security are the supreme necessity. Neither education, public health, nor any other vital

service of the nation can be promoted unless stable government and respect for law are assured. Much constructive work awaits the coming Dail. Educational reform, long overdue, must be no longer delayed; no departments more urgently demand improvement than university and secondary education. Hand in hand with educational reform must come a real effort to provide efficient health services for the nation. The committee concludes by stating it confidently expects the vote and support of the voters for the three candidates selected who share the views expressed in the appeal issued on their behalf by the Committee of Graduates.

The three candidates selected were the representatives of the National University in the last Dail. Although none of the candidates selected is a member of the medical profession, nevertheless it must be said all of them showed a very keen interest in medical matters in the last Dail and were always ready to assist the medical profession whenever there was an occasion to approach the Minister of Local Government, who had charge of medical affairs. In the latter respect Mr. M. Hayes was frequently the means of bringing the profession in the Free State in contact with the Minister of Local Government. It was he who arranged for and introduced to the Minister of Local Government the deputation from the Irish Medical Committee, the proceedings of which were reported in the BRITISH MEDICAL JOURNAL (August 11th, 1923, pp. 259 and 260). Professor William Magennis also did excellent work in the last Dail for the profession. He made, on different occasions, eloquent and powerful speeches urging the better treatment of Poor Law medical officers both as regards salaries and pensions, and put himself on every occasion at the disposal of the profession when it was a case of redressing their legitimate grievances. It is hoped that medical graduates of the National University, resident in Great Britain and Ireland, will not fail to record promptly their votes for the candidates whom they have reason to believe will best serve their interests and the interests of public health generally in the new Dail.

At the time of writing, Dublin University has not selected its representative for the Dail. It is, however, almost certain that Sir James Craig, M.D., will be a candidate if there is to be a contest, and it is hoped the electors of the Dublin University will record for Sir James their first votes. Sir James Craig was a most successful and popular member of the last Dail; he did excellent work in enlightening members of that body with regard to all matters of a medical nature, and whenever, in this respect, he made representations to the Government he generally succeeded in getting most of what he wanted.

Warning to University Voters.

University electors should lose no time in returning their ballot papers when signed and with them the identification certificate—either without the other is useless. The poll will be open for *one day only*, MONDAY, August 27th; and as the postal service is still somewhat disorganized, the proper course is to have the necessary papers signed and returned without an hour's delay.

DR. M. J. NOLAN.

The next meeting of the Medico-Psychological Association of Great Britain and Ireland will be held in Belfast in July, 1924. Dr. Michael J. Nolan, resident medical superintendent of Down District Asylum, Downpatrick, Northern Ireland, has been nominated president-elect of the Association. Dr. Nolan is consulting visitor in lunacy to the Lord Chief Justice of Ireland and to the Lord Chief Justice of Northern Ireland, thus having the unusual distinction of simultaneously holding corresponding positions under the Irish Free State and the Government of Northern Ireland. He has had a considerable influence on legislation affecting the insane in Ireland. The permissive power granted to county councils to contribute towards the establishment of a central asylum for the investigation of the pathology of insanity was due to his efforts, as was the extension to Ireland of the provisions of the Asylum Officers' Superannuation Act.

India.

THE CONTROL OF PLAGUE.

THERE has been a recrudescence of plague in Delhi and the Punjab. A correspondent informs us that the first outbreak in the neighbourhood of Delhi began in January at Ghaziabad, a large junction for grain and goods traffic. It shortly extended to the villages just beyond New Delhi. Jats, the farmer caste, fell victims first, and then the lower castes, chamars and sweepers. One of the members of the Cambridge University Mission to Delhi moved into the infected district, and the chamars, who are Christians, were persuaded to leave their houses, to burn rubbish, to kill rats, and to be inoculated. A small mud mission church was turned into a plague hospital; one of the English Mission nursing sisters and an Indian nurse lived in a hut near by, and a woman doctor of the English Mission went out every second day. The authorities sent an Indian hospital assistant with antiplague serum, but except for the Christians few at first consented to be inoculated. The mortality among the jats was very high. The sweepers who applied for help were taught how to clean their houses and not to put healthy babies in plague patients' beds; they also consented to be inoculated. Eventually the value of the serum was generally recognized, and the sister and her volunteer Indian helper were able to take part in the inoculations as the epidemic declined. The plague reached Delhi itself and got a firm grip not only on the grain markets, but on every quarter of the city. A Social Service Committee, including a Parsi doctor, was formed to assist the municipal authorities. The city was divided into districts and social workers visited each house. The students of St. Stephen's College and boy scouts, under the leadership of their professors and scoutmasters, worked untiringly. At St. Stephen's Hospital a doctor was ready every afternoon to inoculate, and a "purdah" woman could be safeguarded. Over a thousand people were inoculated and either escaped altogether or had only a mild attack. Our correspondent praises also the work of the assistant surgeons and of the Indian nurses. The outbreak seems, at least temporarily, to have come to an end.

THE RED CROSS IN INDIA.

The annual general meetings of the St. John Ambulance Association and the Indian Red Cross Society were held at Simla on June 19th, when Lord Reading presided. The Commander-in-Chief, Lord Rawlinson, who presented the report of the Indian branch of the St. John Ambulance Association, said that it showed a record of good work, in which the progress made during the previous year had been maintained and in some respects improved upon. There was infinite scope in India for an extension of the operations of the association, as outside the great cities and the main lines of the railways the field was untouched. Eight hundred courses of instruction in first aid, home nursing, home hygiene, and sanitation had been given to over 16,000 persons, and of these 8,911 passed examinations and won certificates of efficiency. A course of first aid and home hygiene in the schools had been instituted in the United Provinces, an example which he hoped would be followed in the other provinces. The report of the Red Cross Society was presented by Sir Frederick Whyte, who paid a glowing tribute to Sir Malcolm Hailey, the outgoing chairman of the committee of management, who had rendered invaluable services to the society in the critical years of transition from war to peace. There was ample scope for all the sister organizations, but in order to secure the fullest economy of effort an agreement with the other bodies should be reached. He drew special attention to the work in the North-West Frontier, and referred to the work in Hyderabad cantonment as practical proof of the results achieved. There, a large mortality used to occur among British babies, but child welfare work was started under Mrs. Godwin, and within one year the excessive mortality was completely wiped out. In conclusion, Sir Frederick Whyte laid particular emphasis on the need for education. The Viceroy,

in reviewing the activities of the two associations, said that there could be no breath of controversy regarding their objects, and there was every reason to expect that they were now established on a permanent footing as a powerful beneficent agent in time of peace.

THE CHEMICAL EXAMINER'S DEPARTMENT IN MADRAS.

The report for 1922 of the chemical examiner to the Government of Madras, Major Clive Newcomb, I.M.S., contains some interesting notes on medico-legal investigations. In 220 cases of suspected human poisoning, poison was detected in 108 (49.1). Mercury was the poison most commonly found (thirty-two cases), arsenic second (twenty-three cases), and opium third (nineteen cases). Of the less common poisons there were two cases of poisoning by cyanide, one by iodine, one by caustic soda, one by carbolic acid, and one by quinine and ergot. In four cases a poisonous alkaloid was extracted from the viscera, the exact nature of which the chemical examiner was unable to determine. The number of articles examined for blood or other stains was 1,583, a larger number than in any previous year. A larger number of bomb cases than usual was received, and in one of these no fewer than 400 bombs made to explode on percussion were sent. The number of general analyses performed during the year was 570, 144 of them for the Customs Department. Major Newcomb notes the regularity with which murder cases occurred throughout the year. The monthly records of murder cases for the past ten years were examined, but no seasonal variation could be detected. The number of cases of poisoning and blood-stains received from 1912 to 1921 was 4,645, an average of 38.7 a month; the month with the highest average number was July, with 43, and the lowest November, with 34.

WOMEN'S HOSPITALS IN INDIA.

A pamphlet on the planning and equipment of women's hospitals in India has been published by the Council of the Countess of Dufferin's Fund. Few of the hospitals staffed by women in India are Government institutions, the only Government hospitals being the Cama Hospital at Bombay, the Dufferin and Lady Lyall Hospitals at Agra, and the Victoria Hospital at Madras. Other hospitals have been built by private generosity, assisted by charitable funds or aided by local authorities, or have been built and are conducted by missionary societies. The importance of creating an endowment fund when establishing hospitals of this type is emphasized, and plans are appended for the construction of different types of hospitals, ranging from a zenana hospital of eighty beds to a dispensary with an emergency ward of four beds.

MINTO NURSING ASSOCIATION.

In the report of the Minto Nursing Association for 1922 the secretary states that subscriptions have fallen off considerably, and that with a view to easing the finances it was decided to restrict as much as possible the expenses incurred on account of passages to Europe, and to engage as many suitable candidates for the nursing staff as could be procured in India. The association was founded in 1906 as the result of an appeal made by Lady Minto both in India and England; the endowment fund has gradually increased, and with the assistance of a Government grant homes for nurses have been established in seven provinces of India and in Burma. The total number of cases attended during 1922 was 1,537, as against 1,463 in 1921.

LADY READING HOSPITAL, SIMLA.

The foundation stone of the Lady Reading Hospital for Women and Children at Simla was laid by the Countess of Reading on June 15th. The hospital is designed to provide fifty to sixty beds, with up-to-date equipment and an efficient staff, to meet the medical needs of Indian women and children particularly in Simla and the surrounding districts, but also in other parts of India. It is well endowed to meet immediate requirements out of the Lady Reading Women of India Fund. Sir Muhamed Shafi paid a tribute to Her Excellency's unceasing care and attention to institutions maintained for the welfare of Indian women; for many years those in authority had been very anxious for the establishment of a separate institution for Indian women, but many difficulties had stood in the way; it had been left to the energy of Lady Reading to carry out the foundation of an institution long overdue. The Viceroy said that the object of establishing the hospital at Simla was that it should be in as healthy a climate as could be found in India; it would provide an admirable training school for Indian nurses. The efforts of Lady Reading had been supplemented by the Simla municipality, who had shown a very commendable interest in the project by undertaking to provide 12,000 rupees annually towards its upkeep.

COMPULSORY VACCINATION IN HYDERABAD.

Hitherto there has been no proper system of registration of births of children in Hyderabad, but it is known that the mortality from small-pox among children is large. The Nizam has now issued firmans commanding that the system of registering births and deaths in the State should be put on a proper basis in consultation with Colonel B. J. Singh, I.M.S., Director-General of the Medical Department, and that the vaccination of children under the age of one year shall be compulsory throughout his dominions.

Correspondence.

THE WORK OF COTTAGE HOSPITALS.

SIR,—In your leading article (July 21st) on the work of the voluntary hospitals, you refer to the phrase in Sir Napier Burnett's report that "The question arises whether the cottage hospital idea has not been rather overdone." There is no question as to the accuracy of Sir Napier's figures or the value of his report, but I regret that he has given the weight of his great authority to such a statement.

There is no doubt that in some places cottage hospitals are not used so effectively or as fully as they might be, but the statement: "No fewer than 1,839 cottage hospital beds (in England and Wales, excluding London) were unoccupied on an average all the year round," requires careful consideration. The decline in the number of beds occupied is not confined to Group C, cottage hospitals, only, although much more marked there.

In Group B, hospitals of 30 to 100 beds, the average dropped in the three years from 76.7 to 73.0, but this period is probably too short a time from which safely to draw any conclusion.

In Group A, hospitals over 100 beds, there is an average of 17.83 beds unoccupied—that is, 3,737 beds.

In Group B, there is an average of 26.99 beds unoccupied—that is, 2,276; so that in Groups A and B together there are over 6,000 beds "unoccupied on the average all the year round."

In Group C, the average of unoccupied beds is 40.77—that is, 1,864 beds.

Now it is admitted that in the large hospitals a percentage of only 18 unoccupied beds indicates a high pressure of work, and it is well known that the causes which necessitate a certain number of unoccupied beds have more effect the smaller the institution, so that in Group B the average is higher than in A, and in Group C higher than in B.

If we allow the same average for hospitals with less than 30 beds as we find in hospitals with less than 100—that is, 27 per cent.— we see that there would be 1,234 cottage hospital beds unoccupied on the average in a year, and it will be admitted that none of these beds is available for other cases than those normally admitted to the hospital; otherwise if our large hospitals have such long waiting lists why do they not use the 6,000 beds that "on an average remained idle throughout the year 1922"?

I have used this phrase "remained idle throughout the year 1922," which occurs in much the same form in various parts of the report, although I do not agree with it. I am quite sure that its author did not intend it to be misleading, but the impression it gives one is that the same beds were empty throughout the whole of the year. The last paragraph but one of Sir Arthur Stanley's introduction supports my contention. The fact is that these beds are only empty

at odd times; in a cottage hospital a whole ward may be shut up for a month for cleaning purposes and the next month another ward may be closed and then every bed may be full for a couple of months. Even under the best management, assuming that the averaging number of unoccupied beds is 27 per cent. there would last year have been only 630 cottage hospital beds that one might call avoidably unoccupied — that is, barely two beds per hospital; and as they would be unoccupied at such irregular times it is doubtful whether they would in practice be available for convalescent or maternity cases which are the two important suggestions made by Sir Napier Burnett.

Two years ago I should have agreed with him as to the use of these beds for convalescent patients from the central hospitals, but in drawing up a scheme for the co-ordination of the hospital work in this county, when we came to consider the proposal in detail, we found the suggestion as to convalescents to be impracticable unless special extra beds could be provided for the purpose.

With regard to maternity beds, I have long looked forward to the time when every cottage hospital should have a maternity ward, but I do not think it would be possible to use odd beds in general wards for this purpose.

I should be sorry if Sir Napier's report did anything to check the growth of general practitioner hospitals which are fast becoming such an important part of the medical service of the country. That they want in very many instances reorganizing and reforming there can be no doubt, but that is not a reason for doing away with them —in fact, experience has shown that an increase in the number of beds in a cottage hospital often means a higher average of occupation.

Reference in the report is made to some hospitals that undertake too much and others that do too little, but there must always be a considerable difference in the quantity and the nature of the work they do. The rôle of a cottage hospital is to provide for those cases that can be treated by the general practitioners of the neighbourhood and which do not require the special skill and equipment found in the central hospital; at present in many of these a large number of beds are occupied by patients who might well be treated in the surrounding general practitioner hospitals.—I am, etc.,

Bradford-on-Avon, Aug. 10th. CHARLES E. S. FLEMMING.

TRACHOMA AND VISUAL STANDARDS DURING THE WAR.

SIR,—The publication in *Guy's Hospital Reports* by Lieut.-Colonel Eason, now Superintendent of Guy's Hospital, of his experiences as an ophthalmic surgeon during the war, raises two most important questions. I have already drawn attention to these in two publications of my own, one entitled *The A.A.M.C. in Egypt*, and the other *A Vision of the Possible*. The wealth of instance now given by Colonel Eason may induce the authorities to take definite action.

In the first place the experience of oculists in Egypt and Palestine makes it certain that trachoma is not readily contagious, and is not indeed contagious at all in the ordinary sense of the term. It is only contagious when associated with crowding and with dirty habits. The fact remains that tens of thousands of British and Australian soldiers were in close contact with a population which is almost universally infected with trachoma, and that very few contracted it. The army explanation, which may be correct, was that infection was stopped by the abolition of the roller towel. In Australia thirty years ago trachoma was very common, and the cases came chiefly from the country districts and especially from dry, hot and sandy districts. As wealth has increased and the conditions of living improved, there has been a most noticeable decrease in the quantity of trachoma, and it would be very difficult to-day to collect a hundred cases. In other words, trachoma is not contagious except when it is associated with very insanitary conditions. An ordinary white population has nothing to fear from it. It is, therefore, obvious that the legislation against the admission of trachomatous patients into different parts of the world is capable of some modification so far as the risk to inhabitants is concerned.

In the second place Colonel Eason shows definitely what we felt acutely in Egypt and Palestine—namely, that the visual standards established prior to the war and in the early part of the war were far too severe, and were illlogical. All wars in the future will be national wars, and if men are to be excluded from service because they have a running ear or their vision is not perfect or their teeth are not good, then the nation that adopts such a course is almost certain to be defeated. If the use of glasses is to be permitted, then it is almost immaterial what the soldier sees without glasses. The standard adopted by Colonel Eason of 6/24 with or without glasses in one eye, and absence of blindness in the other, should work quite satisfactorily considering the work the modern soldier does. Such vision is quite good enough in the majority of cases, as our experience demonstrated. It would be interesting to ascertain how many additional men could have been obtained for the British Army by the adoption of such a standard, and whether they might not have avoided the defeat of the Fifth Army in March, 1918, if they had been available. The point, however, is that both Lieut.-Colonel Eason and I from practical experience in the theatre of war have had our opinions respecting both trachoma and standards of vision completely altered. Those who have not had the same experience may be a little sceptical, and I suggest that they examine the matter from a critical standpoint.

Finally, the appalling damage done by purulent ophthalmia amongst the Turkish prisoners, many of whom were suffering from pellagra, draws attention to the experimental work done in the production of keratomalacia in animals by a pellagrous diet. The diet of the Turkish soldier was evidently insufficient when combined with heavy military work, and notwithstanding the excellent treatment both with regard to food and medical attention, which they received after capture, it was quite impossible to save a number of them.

I should think that there has never been a campaign in history from which there is so much to be learned as from the campaign in Egypt and Palestine. The theatre of war was cut off from all political influences, and was placed under one command, so that the problems to be faced were obvious to anyone interested. I advise those interested in ophthalmology to go through Colonel Eason's publication carefully.—I am, etc.,

JAMES W. BARRETT,
Lieut.-Colonel R.A.M.C. and A.A.M.C.,
Formerly Consulting Oculist and Aurist, Egypt.

Melbourne, June 7th.

EXAMINATION IN OPHTHALMOLOGY.

SIR,—No one, I fancy, will be disposed to quarrel with your contention (BRITISH MEDICAL JOURNAL, August 4th, p. 195) that clinical ophthalmology ought to receive recognition in the final examination for medical degrees and diplomas. But surely neglect of this recognition is not so complete as you suggest. A large area of clinical ophthalmology is an essential part of general medicine and cannot therefore be excluded from the examination in medicine. Obviously this is true of disturbances of the ocular musculature, of alterations in the visual fields, and of the facts to be observed by the ophthalmoscope. Presumably teaching on these subjects is practised in the medical wards, and certainly questions dealing with them are open to the examiners in medicine. How then can "students know they will not be examined" on such topics? In a fairly long experience as a university examiner in medicine I have always felt free to put questions on medical ophthalmology and have found, possibly under the influence of this reputation, an increasing capacity to answer them.

It may, perhaps, be desirable to cultivate a similar development on the topical or surgical aspects of the subject, but to suggest that because there is no "special ophthalmological examination . . . conducted by ophthalmic surgeons" the student "cannot be expected to give much attention" to ophthalmology is a proposition that may

prove disastrous to a candidate innocent enough to accept it. In so far as it is true it can only mean that examiners in medicine neglect their opportunities and responsibilities, and this, I am sure, you would be reluctant to propose.—I am, etc.,

London, W., Aug. 6th. C. O. HAWTHORNE.

REPRODUCTION AND THE SHEDDING OF ANTLERS IN DEER.

SIR,—Are we fully justified in drawing such a direct and intimate connexion between those two processes as is done by Sir William Macewen in his address to the International Society of Surgery (BRITISH MEDICAL JOURNAL, July 21st, p. 91)? Most animals fight each other almost at any time of the year; still in the breeding season (usually in spring) they are more pugnacious, and are then at their best in fitness, physique, and beauty; but the tegumentary adornments such as the mane of the lion, the clean and glossy skins of other animals, and the beautiful plumage of male birds are there to make the males more attractive to the females, and not for fighting purposes. Why then should the beautiful antlers of the deer be thought of in any other light?

The natural weapons of deer are fleetness, ability to fight with their forelegs and feet, or occasionally with their mouth, and when the velvet permits with their foreheads like oxen. As a fighting machine the antlers are clumsy, and for months annually are out of action. Besides, some stags have no antlers; in some deer they are present in both sexes, and there is an evident connexion between the size of the antlers and the quantity of hair on the bodies of the deer, and as a matter of observation in actual combat the polled stag is often more than a match for the antlered stag.

The peculiarity of the development of the embryo, the duration of gestation, the breeding season being in autumn, instead of spring, are other characteristics of deer, as well as the absence or presence of antlers and their shedding, and are unusual or abnormal.

If, as Sir William suggests, the testes be the *fons et origo* of the antlers it seems most extraordinary that their evolution, growth, and decay should coincide with the most quiescent state of these glands; surely they cannot be active and inactive simultaneously. Do we not hear too much about inhibition and suppression to the exclusion of more natural laws? Might we not more fitly compare the shedding of the antlers to the annual casting of the skins of snakes, the moulting of birds, or loosing of hair, hoof, nail, or other cutaneous appendage in animals, and look on all these phenomena as Nature's effort to assist excretion, continuously or at certain regular periods, by throwing off from the blood certain salines or products of nitrogenous metabolism, many animals having their own particular method?

Physiologically the falling of leaves from trees may reasonably be compared to the shedding of antlers, and in both, when the process is allowed to occur naturally, a beautiful clean scar is left. Here again, in my opinion, both leaves and antlers come and go for the beauty, health, and life of the tree and animal respectively, for self-preservation is more important than either reproduction or the herd instinct.

In recent years too much importance and attention have been assigned to matters reproductive, and a hint from one in the professional position of Sir William Macewen might become an obsession in the mind of a weaker brother.—I am, etc.,

Harrogate, Aug. 6th. T. JOHNSTONE, M.D., M.R.C.P.

PATHOLOGY OF MALIGNANT DISEASE.

SIR,—The difficulty in obtaining cultures or transplants from malignant tissue is evidence that the conditions of viability of this tissue or of a possible parasite which gives rise to it are narrowly defined. We should be able to determine these conditions more accurately, and vary them in a sense adverse to the disease without waiting for the demonstration of an ultimate cause.

For instance, the chemical reaction of the fluids of a malignant tumour is not usually considered. There is some reason to think that the reaction is acid, and we can neutralize carbonic or other acid by injections of a solution of sodium carbonate as directed by Fischer in his book on oedema and nephritis; possibly an even more effective result may be obtained by using a calcium base.

Again, malignant tumours are anaerobic; repeated injections of oxygen in the tissues near a tumour must produce a powerful effect, both local and constitutional, so that if the injections have to be made some little distance from the growth they will still be active, although the action will be indirect.

These questions are sufficiently practical to deserve the attention of those who have clinical material at their disposal and can work effectively at them.—I am, etc.,

London, W., Aug. 11th. RICHARD KERRY, M.D. (Montreal.)

DENTISTRY AND MEDICINE.

SIR,—I have read with much interest the article by Sir William Willcox on "The clinical, pathological, and radiological aspects of infection of the teeth and gums" (January 13th, 1923, p. 53). It is well that men like Sir William Willcox are now recognizing the full importance of this subject. Many of us have been preaching the menace of oral sepsis, but presumably it still requires to be preached (though in some quarters the pendulum has swung to the opposite extreme and many ills are credited to quite innocent teeth). From the internal evidence of the paper alluded to I could flatter myself that Sir William Willcox had read the chapter on oral sepsis and its effects in my textbook on *Stomatology*. Whether this is so or not I am satisfied that the necessity for the writing of such papers arises from a weak spot in the medical curriculum. There is no systematic (compulsory) teaching for medical students on those border-line subjects lying between medicine, surgery, and dentistry. There should be a liaison lecturer—and then residents would recognize oral sepsis as "an actual potent factor in the causation of every-day disease."

In this University we have a short Course on Stomatology which it is compulsory for every medical student to attend in his fifth year. The course embraces:

1. Deformities of the teeth and jaws, including cleft palate.
2. Inflammatory conditions of the gums, mucous membranes, caries of the teeth—diagnosis and treatment.
3. Fractures and dislocations of the jaws.
4. Ankyloses of the jaws.
5. Oral sepsis and its effects, and conversely the manifestations of systemic diseases in the mouth.
6. Reflex neuroses and neuralgias.

The results of this class have been eminently satisfactory; the students are keen and take a live interest in the subject. The following are the questions set at the last examination:

1. Enumerate the various methods of treating cleft palate and give the indications for the use of each method.
2. Differentiate between dental myelitis (exposure of the pulp) and periodontitis. Outline palliative treatment for each condition.
3. Oral sepsis: classify secondary infections and give examples of each.
4. Enumerate fluid swellings of the jaws. From what tissues is each derived? Give the chief diagnostic characteristics and indicate treatment in each case.

My class this year was composed of some seventy students, and I have no hesitation in saying that 80 per cent. of the answers were better than one would expect in a final qualifying dental examination.—I am, etc.,

Dunedin, New Zealand, May 25th. H. P. PICKERILL, C.B.E., M.D.

THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

SIR,—Surely Dr. Cameron Kidd's colleague must have misinterpreted his final "instruction"—"If you find vesicles on the palms of hands and soles of feet you may call it small-pox"? (BRITISH MEDICAL JOURNAL, August 4th, p. 208). As it stands, anything more misleading as a diagnostic criterion for small-pox it would be difficult to find.

It seems such a pity and so unnecessary that these half-truths should still be circulated and pass as current know-

ledge when there exist for small-pox such admirable guides to correct diagnostic methods as are provided by the writings of Ricketts and of Wanklyn.

During the war it fell to me, when attached to the Base Isolation Hospital, Mesopotamia, to act for a considerable period as receiving room officer for the primary purpose of making the differential diagnosis between small-pox, chicken-pox, and "other diseases." Chicken-pox was extraordinarily prevalent and severe amongst Indian troops and followers and was characterized by initial malaise and profuse eruption. Small-pox was endemic amongst the Arabs and was also introduced by sea from India (five days' voyage).

In Mesopotamia, besides the relatively small imported European military population, almost every type of Asiatic—indigenous and introduced—was to be found. In spite of the varying types of the disease (small-pox), diverse nationalities with widely differing skin textures, habits, postures, occupations, and clothing (the lines of pressure from garments differ markedly, of course, in Europeans and Asiatics), the principles of diagnosis originally laid down by Ricketts and so ably expounded by Dr. Wanklyn held good—with the reservation that Ricketts's "sign of the axilla" had not, I thought, so great a value as it possesses in this country. (Most of the Asiatics were infested with lice and the axilla was a site of chronic irritation.)

It cannot be too strongly emphasized that the differential diagnosis of small-pox, as regards distribution, rests not upon the absolute distribution (hence the "soles and palms" misunderstanding), but upon the relative density of distribution of the lesions in different regions of the body. Are the lesions preponderatingly centripetal or centrifugal?

In the absence of material it has been necessary to teach students—however imperfectly—the distribution of small-pox by utilizing cases of chicken-pox and emphasizing with a skin pencil the differences in distribution between the two diseases. It is surprising how often it has been possible to demonstrate—in cases of indubitable chicken-pox—lesions on the palms and soles, and yet to show that the principles of diagnosis of Ricketts and Wanklyn were not violated.

With regard to Dr. Kidd's surmise that the whole epidemic may be chicken-pox, I may say, perhaps, that one of the Birmingham cases was an unvaccinated child who had a history, and who showed typical scars, of a previous attack of chicken-pox. The total number of small-pox lesions this child presented was certainly not more than thirty. The distribution of these lesions and the character of the lesions themselves were typical of small-pox. The child was vaccinated in hospital—unsuccessfully.—I am, etc.,

E. H. R. Harries, M.D.Lond.,
Medical Superintendent, City Hospital, Little Bromwich; Clinical Teacher of Infectious Diseases, University of Birmingham.

Aug. 6th.

Sir,—Dr. C. Killick Millard (British Medical Journal, August 4th), in commenting on my suggestions *re* vaccination propaganda, remarks that I exaggerate and am unfair. As regards the former I would ask him three questions—namely:

1. Do cases of confluent small-pox occur, and are they liable to occur in most epidemics of the disease or not?
2. Does the disease ever cause disfigurement by pitting and opacities of the cornea or not?
3. Do the returns show that vaccinaction, and only vaccination, is the safeguard against attacks of small-pox or not?

These are well known facts and could not be called exaggerations; it is upon these facts that I have based my suggestions.

As regards the latter part of his letter, I should not be surprised if the Anti-Vaccination League publishes it as an exposition of the doubt that exists (according to Dr. C. Killick Millard) as to the protective power of vaccination against small-pox.

Personally, in spite of Dr. Killick Millard, I am still quite convinced that my suggestions are fair and expedient, and if carried out would go a long way towards convincing the layman of the advisability of being vaccinated against small-pox.—I am, etc.,

V. St. John Croley,
L.R.C.P. and S.Ed., D.T.M. and H.Lond.

Budleigh Salterton, Aug. 6th.

CANCER RESEARCH.

Sir,—Dr. Leonard Molloy's letter in your issue of August 11th requires correction in one or two essentials. The British Empire Cancer Campaign is distinct from the Imperial Cancer Research Fund; the latter has been in existence for twenty years. The British Empire Cancer Campaign is not yet in existence as an organization engaged in cancer research. Dr. Molloy says that the Treasury grant to the Imperial Cancer Research Fund is "utterly inadequate." This is an erroneous statement of the case, because the Imperial Cancer Research Fund is not now and never has been in receipt of Government financial support, although several Government departments are represented on its General Committee and Subcommittees.

Permit me to add that I disagree with the implication in Dr. Molloy's letter that the only requirement for success in cancer research is money. It is a libel on men of science in this country to suggest that the trained intellects capable of solving the pathological and therapeutic problems of cancer are here and only waiting for the money to tempt them to engage in these problems.—I am, etc.,

J. A. Murray.

Imperial Cancer Research Fund,
8-11, Queen Square, W.C.1.
Aug. 13th.

CHAUFFEUR'S PALM.

Sir,—M. Dupuytren, in his classical lecture on *Contracture de l'annulaire*, gives the case of a marchand de vin gros, who "à l'instant où il essayait de soulever l'une de ces pièces de vin, qui sont ordinairement fort volumineuses, en plaçant la main gauche au-dessous du rebord saillant formé par l'extrémité des douves, ressentit, au même moment, un craquement et une légère douleur dans la partie interne de la paume de la main." This was followed after a time by a Dupuytren's contraction of the ring finger.

The projecting *douve* or stave of the great cask must have been much like the starting-handle of a car, the sudden strain causing pain much like a back-fire. I have never seen this deformity in a garage attendant or chauffeur, but if there was any teaching in M. Dupuytren's case we may expect to when these men grow older.

The only motor trouble I have seen has been pain, stiffness, and some loss of power in the right leg. It has appeared in those who have lately learnt to drive, who have driven many miles a day, and who use an acceleration pedal. It disappears after a week or ten days' rest, and is no doubt due to the cramped action of the right leg when using this pedal. The pressure is not sufficient to give any useful support to the leg, which has to be held up and used by muscular power alone. The condition may be a little puzzling, if the history of the accelerator is not obtained.—I am, etc.,

O. Clayton-Jones, M.B.Oxon.

Silverton, nr. Exeter, Aug. 6th.

MEDICAL CHARITIES.

Sir,—It was with considerable interest that I read the two contributions which appeared under this heading in last week's Journal.

Sir Charters Symonds certainly gives some useful information, but I do not think anyone would care to assert that his letter makes the position look any brighter or more encouraging. To my mind it appears particularly unfortunate that so important a functionary as the treasurer of the fund should feel constrained to take refuge in the very much overwrought excuse of "apathy of the profession."

I am no believer in this explanation. The average medical man is a busy individual who is compelled by the nature of his work to concentrate his mind on a considerable number of important matters during every day of his existence, and this process quite commonly involves the rapid exclusion from his thoughts of what may casually appear to be minor considerations. In my opinion, therefore, the fault lies in his never having been brought to realize that he has a definite moral obligation towards the poor and distressed of his profession.

If I am correct in this assumption, the remedy must lie

in convincing all medical men that their own charities must be brought out of the rut of secondary considerations and made to rank among those which require dealing with. The amount of subscription required should not prove to be anything approaching a deterrent, for it cannot really be assumed that an average subscription of 10s. 6d. would financially complicate anybody's pocket, and, so far as concerns members of the British Medical Association, the forwarding of this need not involve any extra effort as it can be included in the cheque for the annual subscription.

I believe the necessary education of the profession involves organized effort, and that any campaign in this direction can only be successfully undertaken with the help of the British Medical Association. I further believe that the first step to take is to sweep away the differences of opinion respecting the management of the fund, and that this could be effected by resuming the interrupted conference of 1922. In this direction I would make the suggestion that an invitation to recommence the sittings might, on this occasion, very appropriately emanate from the Governors of the fund.

The letter from Dr. Clarke is very practical, and reveals a valuable source of help which promises good results if properly managed and developed. Organized effort would see to this.—I am, etc.,

Manchester, Aug. 14th. W. F. Dearden.

MEDICAL MAGISTRATES.

Sir,—In the important discussion on mental deficiency which took place in the Section of Medical Sociology at Portsmouth last month, and is recorded in this week's Journal, there is a point which is not referred to by any of the speakers to which I wish to call the attention of the public and profession—namely, the desirability of having on every magisterial bench at least one medical man.

There is a considerable number of cases brought before the justices in which medical knowledge and experience are required for the full and just treatment of the person charged.—I am, etc.,

W. J. Tyson, M.D., F.R.C.P.,
Chairman of the Elham Division of Justices for Kent.

Folkestone, Aug. 11th.

TREATMENT OF VENEREAL DISEASE.

Sir,—With reference to the letter from Sir John Collie on this subject in your last issue the National Council for Combating Venereal Diseases wish to express their very grateful thanks to Sir John Collie for all the trouble he took in getting this bill, drafted and promoted by it, through the House of Commons.

The same bill in the last Parliament became an agreed measure, and only failed of becoming law owing to the sudden dissolution. Sir John Collie was kind enough to undertake to father it at its reintroduction in the present Parliament, and as an agreed measure it passed the House of Commons. The thanks of the Council are also due to Lord Muir Mackenzie, who at the request of Sir John Collie undertook to shepherd it through the House of Lords.

The National Council has been working to obtain this legislation since 1919.—I am, etc.,

E. O. Grant, Secretary.

National Council for Combating Venereal Diseases, 102, Dean Street, W.1, Aug. 13th.

An international vacation course will be held at Kissengen from September 3rd to 6th, when lectures will be delivered by Drs. Umber, von Bergmann, von Noorden, and von Romberg.

During the ten years 1912–21 there have been released on parole from the Kalihi Hospital, near Honolulu, and on Molokai Island, 242 lepers as being no longer "a menace to the public health." The patients were required to report for examination, when it was found that 31 had relapsed, but 7 of these were discharged again on parole. Ten were released completely. Treatment for those who desire it is by chaulmoogra oil and its derivatives. The parole system has worked well and many lepers now go to the hospital voluntarily, thus obtaining earlier treatment and a consequent greater chance of improvement. About 70 per cent. of those released on parole were segregated for less than two years.

Obituary.

FREDERICK BELL, B.A.Oxon, M.R.C.S., L.R.C.P.,
Humshaugh.

The death of Dr. Frederick Bell of Humshaugh, which occurred on July 28th, robs North Tynedale of a notable personality. Only a brief sixteen years ago he first came to the district, but the large gathering from far and near which met at his funeral in the quiet churchyard at Humshaugh bore eloquent testimony to the way in which he had entered into the lives and affections of the people among whom he lived and worked.

Dr. Bell came of a medical stock and was the third generation of his family who had practised at Preston in Lancashire. He was the second son of the late Dr. Wm. Bell of that town, and was educated at Preston Grammar School and New College, Oxford, where he graduated B.A. with honours in science. His medical studies were pursued at St. Bartholomew's Hospital, and he took the conjoint diplomas in 1888. He then returned to Preston as house-surgeon to the infirmary, and on the sudden and unexpected death of his father he took over the family practice. For eighteen years he worked strenuously and loyally in that capacity and was greatly respected in the town. Unfortunately his health, which was never robust, proved unequal to the strain and for that reason he sought a quieter sphere in the rather remote country district of Northumberland where Humshaugh is situated. Very soon the stranger from Lancashire became the trusted medical adviser of a wide area, and for years "Bell of Humshaugh" was one of the best known of the country practitioners in Northumberland. Those who know country practice best are well aware that the motor car and the Insurance Act have not really lightened the labour of the doctor, and Bell led a strenuous life, far too strenuous for his poor physique, and he was dogged by a series of grave illnesses, each attended by great anxiety to his family. But he either never would or never could spare himself, and in spite of the advice of his friends he worked "full out" almost to the end. His fatal illness, septic laryngitis, followed by septicaemia, was caught at the bedside of a patient who preceded the doctor to the grave. Bell had a very high sense of his responsibility to his patients, and he constantly strove not only to give them of his very best but to get the very best for them; this was the reason why he so often sent patients to hospital or called friends in consultation. But he was not content merely to hand over a case; he persistently followed his patients, and no practitioner more frequently attended operations or made inquiries about those of his flock who had temporarily left his care. This he did in winter as well as summer, in a district with a wretched train service, and having over twenty miles of the most exposed road (on the line of the Roman Wall) to traverse both going out and coming home. This same anxiety to do the best for his patients made him one of the most regular visitors at the scientific meetings and the post-graduate courses held in Newcastle. It is a sad coincidence that during his fatal illness he was unanimously elected president of the Newcastle-upon-Tyne and Northern Counties Medical Society. The British Medical Association also appealed to him and he threw himself energetically into the work of the Hexham Division, of which he was successively secretary and chairman. Of leisure he had none, but his tastes were literary and the company of books and the fragrance of flowers beguiled odd half-hours and made him content with his arduous lot, while an earnest religious faith consoled him in many a trial.

He leaves a widow, one son—an officer in the Indian Army now with his regiment—and two daughters, the elder of whom has recently graduated with the desire and intention of helping her father in his practice.

No one in North Tynedale was more respected, and the whole countryside bemoans his loss, for everyone feels that men of his stamp can ill be spared. The funeral was very largely attended by representatives of all classes, including numbers of medical friends. Floral tributes, like the congregation, overflowed from the church to the graveside and were a token of the love which his patients bore him.

ROBERT ANDERSON, M.D.Edin.,

Gateshead.

On August 6th, with tragic suddenness, Dr. Robert Anderson of Gateshead passed away. Although in his 80th year Dr. Anderson was well preserved, and was busily occupied until the day of his death. It was the present writer's privilege to have known Dr. Anderson for over forty years, during which nothing ever occurred to mar the friendship. At the early part of the period referred to, Dr. Anderson was a busy colliery doctor at Seaton Delaval, a few miles from Newcastle-upon-Tyne. The death of Dr. Davidson, to whom he had acted as assistant, threw Dr. Anderson when still a comparatively young man into a large practice; he became surgeon to several of the collieries and had sometimes to employ five or six assistants. Dr. Anderson carefully supervised their work, visited the collieries daily and was always at the call of his assistants. He thus knew his patients and their families intimately, entered into the joys and sorrows of their family life, and was looked upon as a friend as well as their medical adviser. Notwithstanding his many duties, Dr. Anderson found time to deliver evening lectures in neighbouring villages on health and social problems, and thus helped to stimulate among the Northumbrian miners that desire for learning which has been so characteristic of them as a class.

Dr. Anderson was in the North of England the first medical man to introduce an organized ambulance service into the collieries. He became one of the most active and inspiring members of the St. John Ambulance Association, and for years he drilled and instructed the miners so that they might be able to deal in the gentlest and safest manner possible with their comrades injured underground. Many honours were bestowed by the central authority of the Order of St. John of Jerusalem upon the late Dr. Anderson in recognition of his important services. Only a few months ago he retired from his position as Assistant Commissioner of the No. 6 District of the St. John Ambulance Brigade. Twenty years ago he retired from the greater part of his active medical duties and came to Gateshead, but only to identify himself with public work. Dr. Anderson was a fine example of straightforwardness and of honourable dealing with his patients and the medical profession. He was a fluent speaker and upon subjects with which he was well acquainted he frequently, years ago, enlivened debates at the meetings of the Northumberland and Durham Medical Society. There was a freshness in his views which appealed, knowledge based upon experience which convinced, but above all an openness of mind which made him receptive to new ideas and methods of treatment. He was educated—as it was his pride to recount—at Edinburgh University during the palmy days when among its medical professors were numbered such men as Syme, Simpson, Hughes Bennett, and Christison. He graduated M.D.Edin. in 1864, and took the diploma of L.R.C.S.Edin. in the same year.

A member of the Established Church of Scotland, Dr. Anderson was for fifty years an elder in the Presbyterian body. During the last twenty years he acted in this capacity in Park Terrace Church, Gateshead, and there, prior to the interment in Saltwell Cemetery, a service was held, attended by the Mayor and Corporation of Gateshead, representatives of the medical profession and of the St. John Ambulance Association, and by a large body of the public, by whom he was held in high esteem. He is survived by his widow, two daughters and three sons.

T. O.

Dr. Oliver Smith passed away peacefully in his home in Gorleston on August 5th. Though he was only 41 years old, he had already made his mark, and was greatly respected by his fellow practitioners as well as by his many patients. After a distinguished career at Edinburgh University he spent several months at sea as a ship surgeon, and then held the appointment of house-surgeon at the Great Yarmouth Hospital. Here his conscientiousness and professional skill were greatly appreciated, and when his term of office came to an end he was invited by Dr. P. G. Gilmour to join him in a partnership, which lasted fifteen years till Smith's death. It was a matter of regretful wonder to his closest friends that he did not engage in research work, for which his keen intellect seemed to fit him. Though his practice was growing steadily, he managed to read much and keep abreast of the times, and his scientific bent showed itself in his love of instruments of precision. He took infinite pains, and never committed himself to a diagnosis or line of treatment till he had carefully weighed all the available evidence. It follows that he had seldom to retrace his steps. In the R.A.M.C., during the war, he developed his taste for operative surgery, and he continued to perform major operations till his illness at last forced him to give up work. He was confined to bed for about six months. He bore his crushing reverse of fortune with infinite courage—a courage which his wife also showed to a marvellous degree. She nursed him day and night throughout his illness, showing a sublime fortitude and disregard of self. It is no exaggeration to say that all Gorleston was plunged into grief by his death, and his former patients realized that they would no longer be cheered by that kindly smile which used to light up his clean-cut, intellectual features. He was a member of the East Norfolk Division of the British Medical Association.

We regret to record the sudden death, on July 28th, of Dr. Walter William Chamberlain of Rawdon, near Leeds, at the age of 62. Dr. Chamberlain graduated M.B., C.M. at Edinburgh University in 1887, and was afterwards house-surgeon at Birmingham General Hospital and senior house-surgeon at Halifax Infirmary. He settled at Rawdon twenty-seven years ago and built up an extensive general practice there. He was medical officer of health to the Rawdon Urban District Council, and was honorary medical officer to the Mitchell Memorial Home, Rawdon. A few months ago he was decorated by the King of the Belgians for his services to the Belgian and allied troops who were under his care at various institutions at Rawdon during the war. Dr. Chamberlain held a high position in the estimation and affection of the residents of the district. He leaves a widow, two sons and a daughter. Sir Berkeley Moynihan, in the course of an appreciation in the *Yorkshire Post*, writes: "Dr. Chamberlain was one of the best types of general practitioner, and was greatly beloved and trusted by all his patients and by a multitude of friends. He knew his professional subjects well, and he devoted himself with great care and the most painstaking and unremitting attention to all the details of his cases; to the happiness of his patients no less than to their material welfare. His judgement rarely erred, and a long experience had given him the power to foresee the possible developments of an illness, and the knowledge to check or avoid its consequences. . . . He was among the most popular of men; always cheery, considerate for the words and acts of others, willing to undertake another man's difficulties or to listen to his opinions."

Dr. Edmund Hargreaves of Sheffield, who died on August 9th, was born at Colne, Lancs, in 1846. After serving for a few years in a cotton mill he went to study medicine at Glasgow University, where he graduated M.B., C.M. in 1874 and proceeded M.D. in 1885. He became assistant, and subsequently partner, with Dr. G. Stopford Taylor, and continued the practice after Dr. Taylor's retirement. He was a member of the Sheffield Medico-Chirurgical Society, of which he subsequently became vice-president, and was honorary surgeon to the Prevention and Rescue Society. In 1895 he was elected a member of the city council, and fifteen years later was made an alderman; he had sat on the Sheffield magisterial bench since March, 1906. Dr. Hargreaves was a member of the Sheffield Division of the British Medical Association. He is survived by three daughters and one son, Dr. Robert Hargreaves, who practises at Sheffield.

We regret to record the death on July 13th of Dr. John Sinclair Holden of Sudbury, Suffolk, at the age of 86, Dr. Holden was educated at Queen's College, Belfast, and

graduated M.D., R.U.I., in 1865; he took the diploma of L.R.C.S.Edin. in the same year. For nearly half a century he practised medicine in Sudbury and the surrounding district, but he had retired from practice some time ago. He was honorary consulting physician to St. Leonard's Hospital, Sudbury, having formerly been for a long period a member of the active medical staff, and at the time of his death he was chairman of the committee of management. For many years he was medical officer of health for the borough of Sudbury, and for Glemsford Urban District Council and Melford and Belchamp Rural District Councils. He was one of the senior members of the Sudbury bench of magistrates. He was an old member of the British Medical Association, an ex-president of the East Anglian Branch, and a representative. He was the contributor of a number of articles in our columns during the eighties. He was also ex-president of the Cambridge Medical Society.

We regret to announce the death, on August 8th, of Dr. MARY K. HELENE NEARY, aged 40, wife of Dr. John F. Neary of Blackheath. She was the eldest daughter of the late Dr. Thomas Griffin, Louisburgh, co. Mayo, and niece of the late Sir Peter Freyer. She received her medical education at the Cecilia School of Medicine, Dublin, and the Royal Infirmary, Edinburgh, and obtained the L.A.H.Dubl. in 1918. Dr. Neary served as resident medical officer at the Jenny Lind Hospital for Children, Norwich, for over two years, and subsequently entered into general practice at Stoke Newington and Blackheath. She was a member of the Lewisham Division of the British Medical Association and took great interest in the infant welfare scheme, for which she will long be remembered in Bermondsey, where she did a large amount of work in connexion with the movement. She greatly endeared herself to her patients by her kind manner and the confidence she inspired, and many will mourn her untimely death.

The death, from appendicitis, of Dr. K. I. S. SMITH, at the early age of 30, occurred at Sunderland on July 20th. Dr. Kirton Ivor Seager Smith was educated at the Newcastle School of Medicine of Durham University, and graduated M.B., B.S.Durh. in 1914. Shortly after the war broke out he obtained a commission in the Northumbrian Field Ambulance, R.A.M.C.(T.F.), in which he eventually held the rank of major. On his return home from Salonica in 1919, he went into general practice at Sunderland, where he soon became very popular. He leaves a widow and a young child.

The death is announced, by cable, of Dr. ARTHUR POOLE, of Umzinto, Natal. Dr. Poole graduated M.B., Ch.B. at Glasgow University in 1911, and held a commission in the R.A.M.C. from 1915 to 1919. After practising for a short time in Manchester he went to South Africa a year or two ago. He is survived by his widow, to whom he was married in 1921.

The Services.

THE KING has conferred the Royal Naval Volunteer Reserve Officers' Decoration upon Surgeon Captain Arthur R. Bralley, M.C.

DEATHS IN THE SERVICES.

Colonel Henry John Waller Barrow, Army Medical Service (retired), died at Weymouth on July 30th, aged 73. He was the son of Inspector-General T. W. Barrow, A.M.D., and was educated at Guy's. He took the M.R.C.S. and L.S.A. in 1871 and entered the army as assistant surgeon on September 30th, 1871; while the regimental medical system was still in force he served for a time in the 43rd Foot, now the 1st Battalion of the Oxford and Bucks Light Infantry. He attained the rank of colonel on September 25th, 1901, and retired on July 7th, 1910. He rejoined for service during the recent war, from December 24th, 1914, and was for some time in charge of a hospital at Epsom. In September, 1873, he served in medical charge of a company of the 43rd L.I., which attacked and destroyed a company of Moplah fanatics at Kolatare, on the Malabar coast of Southern India. Twelve years later he served in the Sudan expedition of 1885, at Suakin, and in the Sudan Frontier Force in 1885–86, when he was present at the action of Giniss, and received the Egyptian medal and the Khedive's bronze star. Colonel Barrow's family have contributed several officers to the medical service of the army. His father, Inspector-General T. W. Barrow, served in the Crimea. His elder brother, Lieut.-Colonel T. S. Barrow, served in the A.M.D. from 1864 to 1884. His twin brother, Lieut.-Colonel F. E. Barrow, entered the same day as himself, but two places senior to him, served in Egypt, the Sudan, and South Africa, and retired in 1893. His son, Colonel H. P. W. Barrow, C.M.G., D.S.O., is now serving.

Dr. James Desmond McCarthy, C.M.G., late R.N., died at Sway, Hampshire, on July 28th, aged 84. He served as surgeon in the Royal Navy from 1872 to 1874, when he resigned in order to enter the Colonial Medical Service, in which he served for sixteen years on the West Coast of Africa. He was assistant colonial surgeon at Lagos from 1877 to 1880, and full surgeon from 1880 to 1884, when he became chief medical officer of the Gold Coast Colony. In 1891 he received the C.M.G. and retired in 1893. He served under Sir Garnet, afterwards Lord, Wolseley in the Ashanti expedition of 1873–74, and was present at the capture of Kumasi, being mentioned in dispatches and receiving the medal with a clasp.

Universities and Colleges.

UNIVERSITY OF OXFORD.

AT a congregation held on August 8th the degree of doctor of medicine (D.M.) was conferred upon M. O. Raven.

LONDON INTER-COLLEGIATE SCHOLARSHIPS BOARD.

THE following awards of medical scholarships and exhibitions have been made on the results of the Board's examinations held in June:

University College.—Bucknill Scholarship: J. R. Pierre. Medical Exhibitions: A. S. Hatch, M. Levy.

Westminster Hospital Medical School.—Natural Science Scholarship: H. J. Shorvon.

London (Royal Free Hospital) School of Medicine for Women.—Mabel Sharman Crawford Scholarship: Marguerite M. Fenn. St. Dunstan's Medical Exhibition: Joyce R. Woods. Isabel Thorne Scholarship: Decima M. Tracey. Mrs. George M. Smith Scholarship: Kathleen E. Gambrell.

Medical News.

THE formal opening of the winter session, 1923–24, of the Middlesex Hospital Medical School will take place on Tuesday, October 2nd. The introductory address will be delivered at 3 p.m. at the Scala Theatre by Mr. Somerville Hastings, F.R.C.S., on team work in nature. The prizes to successful students will then be distributed by H.R.H. Princess Alice, Countess of Athlone. The annual dinner will be held the same evening at 7.30 at the Trocadero Restaurant, with Sir John Bland-Sutton, P.R.C.S., in the chair.

THE movement known as Health Week was instituted in 1912, and in 1914, at the request of a meeting of local authorities, the Royal Sanitary Institute appointed a committee to undertake the central organization; but local celebrations in each centre are organized and controlled by local committees. The object of Health Week is to focus public attention for one week in the year on matters of health, and to arouse that sense of personal responsibility for health without which all public work, whether by the Government or local authorities, must fall far short of its aims. The next celebration will be held from October 7th to 13th.

ELSEWHERE in this issue (p. 292) is published an article on pure milk in which reference is made to the new tract on pasteurization published by the Ministry of Health. We are informed that a national milk conference will be held in the Guildhall, London, on November 21st. Papers are then to be read on every important aspect of pasteurization—methods and processes, physical changes, chemical changes, bacteriological changes, biochemical changes, and the financial and commercial aspect. The conference is being organized by the National Clean Milk Association, 3, Bedford Square, London, W.C.1.

THE address on "The adaptional machinery concerned in the evolution of man's body," delivered recently by Sir Arthur Keith as the twelfth Huxley Memorial Lecture, is published in full as a supplement to *Nature* of August 18th. The lecture by Professor N. Bohr on "The structure of the atom," published as a supplement in *Nature* of July 7th, is now obtainable separately at 6d., or by post at 7d.

IN his annual report for 1922 on the work of the South Travancore Medical Mission Dr. S. H. Pugh records that Mr. Howard Somervell, F.R.C.S., a member of the recent Mount Everest Expedition, has decided to join the staff of the institution.

AN extraordinary meeting of the Committee of Management of King's College Hospital was held on August 9th to authorize the establishment of a Dental School under the direction of Dr. Alexander Livingston of Liverpool University. At the same meeting the Committee received the resignation of Mr. F. F. Burghard, senior surgeon, to whose work in connexion with the Hospital and Medical School a tribute was paid by the Chairman, Viscount Hambleden. Mr. Burghard is succeeded on the Committee as senior surgeon by Sir G. Lenthal Cheatle, K.C.B.

THE Wellcome Historical Medical Museum will be closed for cleaning from September 1st to 30th inclusive.

THE National Association for the Prevention of Infant Mortality and for the Welfare of Infancy (117, Piccadilly, W.1) has arranged a course of lectures on infant care for health visitors, nurses, midwives, school teachers, voluntary infant welfare workers, and committees of nursing associations, to be held in the Lecture Theatre, University College, Nottingham, from September 24th to 28th, 1923, inclusive.

IN the paragraph published in our issue of August 4th (p. 213) regarding post-graduate courses in Vienna and stating that full particulars can be obtained on application to the Secretary of the Austrian Embassy, the address was incorrectly given; it should have been 18, Belgrave Square, London, S.W.1. We understand that the office is open to visitors from 11 a.m. till 1 p.m.

PROFESSOR ROBERT WIDERSHEIM, the well known comparative anatomist, for many years director of the Anatomical Institute of Freiburg University, has died at the age of 75.

THE twenty-second Flemish Medical Congress was held at Antwerp on August 11th and 12th. The following papers were read: The physiology of the heart, by Professor H. Zwaardemaker of Utrecht; extracardial influences on the heart, by Professor E. de Somer and Dr. P. Maeyer of Ghent; intracardiac arrhythmia, by Dr. S. de Boer of Amsterdam; pharmacodynamics and clinical administration of cardiac drugs, by Dr. U. G. Bijlsma and Dr. M. J. Roessingh of Utrecht; radiology of the heart, by Dr. M. Peremans of Antwerp; heart disease in pediatrics, by Dr. J. Lebeer of Antwerp.

THE Annual Educational Number of the BRITISH MEDICAL JOURNAL will be published on September 1st.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediocra, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

FINE OR COARSE TEA.

"IGNORAMUS" (Christchurch, N.Z.) writes: Considerable discussion has taken place in New Zealand lately concerning the quality of tea that is imported and consumed here. Will any of your correspondents advise me whether there is conclusive evidence that "fine" teas, as I understand they are known to tea experts, have advantages from a health point of view over coarse teas.

MASTICATION.

IN reply to the questions asked by "Fletcherism" in our issue of August 11th (p. 268) Mr. Morley Roberts writes: Your correspondent may be interested to know that Horace Fletcher wrote two or three books on diet and worked at Yale with Chittenden and in Cambridge with Michael Foster, both of whom were favourably impressed by his experiments. Van Someren was Fletcher's son-in-law and used to practise in Venice. I regret to say I can at the moment give no references to the authorities mentioned, nor can I remember the titles of Fletcher's books. They should, however, be found in most medical libraries.

DR. J. R. KEITH (Driffield) writes: Dr. E. H. Van Someren, concerning whom "Fletcherism" has made inquiry, died at Syracuse on February 3rd, 1913, at the age of 41, from diabetes, from which he had suffered for two years. An article, "Was Luigi Cornaro right?" which was read by him at the sixty-ninth Annual Meeting of the British Medical Association, appeared in the JOURNAL of October 12th, 1901. He was a son-in-law of the late Horace Fletcher, the other exponent of prolonged insalivation to whom "Fletcherism" refers. Mr. Fletcher died several years ago, at what age I do not know.

INCOME TAX.

"H. F. V." has claimed to deduct £20 for the expense on medical textbooks, and the local inspector of taxes says that such expenses cannot be allowed.

*** In our view expenditure on maintaining as distinct from improving a practitioner's supply of reference books is admissible, such expenditure being necessary and analogous to the upkeep of "plant and machinery."

LETTERS, NOTES, ETC.

FREEDOM OF NEGRO RACES FROM CANCER.

IN the extracts from Dr. J. Bell Walker's letter on this subject published last week (p. 268) "Zanzibar" was printed in mistake for "Zomba." The sentence should read: "The patient was sent by the medical officer at Chiromo and transferred to Dr. Walker's care at the Livingstone Memorial Hospital, Zomba, for operation." We regret the printer's error which made Dr. Walker seem to place Zanzibar in Nyasaland.

EPITHELIOMA CONTAGIOSUM OF FOWLS.

DR. J. F. CARRUTHERS (Liphook) writes with reference to the note published on August 4th (p. 214) that *cholum* is the Tamil for Indian corn or maize (*Sorgum vulgaris*).

A CASE OF FLAGELLATE DYSENTERY.

DR. CRAWFORD LUNDIE (Thaba 'Nchu, Orange Free State) writes: In view of the article by Dr. Whittingham on flagellate dysentery in the BRITISH MEDICAL JOURNAL of May 12th the following case may be interesting:

A man, aged 70, was first seen for a neighbouring doctor on May 9th, 1921. He had been ill at that time for two and a half months. The stools were at least half blood, very foul, and contained much mucus. He was put on no new treatment, but told to continue the bismuth and opium mixture prescribed by his own doctor. He was not seen again till August 7th, by which time he had been to at least one other doctor at some distance, and had not had his original doctor to see him for three months. To prevent him going to a quack the case was taken up rather reluctantly.

His condition was unchanged, except that he was much weaker and thinner. Before attempting any new treatment a bacteriological examination was made. The report was negative for amoebae and dysentery bacilli, but positive for *Haemamonas hominis*. As no specific treatment is known for that and no references to it could be found in the literature available a trial was made of various intestinal antiseptics. The first was thymol, as a short reference to its use in lamblia infections was found in one textbook, and it is the recognized treatment for hookworm. No benefit seemed to accrue. Of equally little use were beta-naphthol and creosote, the latter given in capsules of 5 minims each. All the time he was given a mixture of bismuth and magnesia, with an occasional addition of tincture of opium, when the pain was very bad, to soothe the irritation and griping. Starch enemas with an occasional addition of opium were also sometimes tried. Sodium sulphate treatment was also unavailing.

No improvement was noted till chinosol was tried. This was begun on August 18th in doses of 5 grains three times a day in the bismuth mixture and double that dose night and morning by enema. The blood gradually disappeared from the stools, as did the mucus, and the frequency of motions declined from every half-hour to twice a day. The patient left his bed and was able to walk about two miles. He required no medical attention from September 26th to October 31st; he put on a little flesh and regained a fairly good colour in that time. At the end of it, however, symptoms of liver trouble developed and steadily got worse till he died on January 22nd, 1922. He had no recurrence of severe diarrhoea nor of blood and mucus in the stools, however, and it is just a question whether the bismuth emetine treatment used by Dr. Whittingham would not have prevented the fatal complications, at least if he had been a younger man. Unfortunately it was not thought worth while to try emetine

when no amoebae were found. No control bacteriological examination was made either, as the patient was too poor to pay for more than was absolutely necessary in order to guide treatment. No *post-mortem* examination could be made, but the symptoms very much resembled liver abscess. It would be interesting to know whether such a complication has ever been definitely found in an infection with this flagellate.

Chinosol was undoubtedly the only drug that seemed to have any good effect on this case. The creosote capsules were continued along with the chinosol and may have helped its action, but they seemed quite useless alone. Perhaps chinosol as an adjuvant in Dr. Whittingham's bismuth emetine treatment would improve his percentage of cures.

Pilocarpine in Sunstroke.

DR. J. MCOSCAR (Buxton) writes: To be forewarned is to be forearmed. Having been a ship's surgeon and had several cases of sunstroke, I give you my experience of the worst case I once had in 1889.

The man, a steward, was told by me not to be on deck without a hat, as we were steaming in the tropics. However, one morning, having had a pint of stout, he was on deck without a cap; he fell down insensible, with stertorous breathing, pupils fixed and contracted, dry burning skin and quick pulse; his face, head, and neck were livid, and the carotid pulsations visible. I gave pilocarpine hypodermically, with one or two minims of croton oil, and placed him with loosened clothing in a cool place on deck. In a little while there was a reaction of the pupils and twitching of the eyelids. After six hours he became semi-conscious, but unable to move. The croton oil acted well; his body was rubbed all over every four hours with raw eggs and brandy. He gradually regained consciousness, and the next morning was able to take some milk food. After a week, during which he was closely watched, he returned to duty. Pilocarpine in these cases, with a good aperient, seems to be the radical cure. The captain, officers, and crew told me they had never seen such a bad case recover, having seen many. Probably pilocarpine had never been given.

Deaths Assigned to Pregnancy and Childbirth.

BEFORE Parliament adjourned the Minister of Health, in response to a request by Mr. Rhys Davies, gave the following statistics affording all available information as to the comparative death rate of women assigned to pregnancy and childbirth in England and Wales and in various European countries:

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Deaths in—										
England and Wales*:										
per million living ...	185	192	176	166	132	127	154	210	168	149
per 1,000 births ...	3.96	4.17	4.18	4.12	3.89	3.79	4.37	4.33	3.91	3.81
Holland†:										
per million living ...	—	—	—	134	131	147	161	—	—	—
per 1,000 births ...	—	—	—	2.58	2.53	3.00	3.35	—	—	—
Italy:										
per million living ...	—	75	—	59	56	—	—	—	—	—
per 1,000 births ...	—	2.41	—	2.45	2.86	—	—	—	—	—
Japan:										
per million living ...	—	—	120	—	120	—	—	—	—	—
per 1,000 births ...	—	—	—	—	3.59	—	—	—	—	—
Switzerland:										
per million living ...	—	—	—	64	44	49	60	62	—	—
per 1,000 births ...	—	—	—	3.37	2.42	2.62	3.19	2.93	—	—
Sweden:										
per million living ...	53	58	63	56	51	—	—	—	—	—
per 1,000 births ...	2.28	2.60	2.90	2.65	2.46	—	—	—	—	—

* The deaths assigned to pregnancy or childbirth in England and Wales (per million living and per 1,000 births respectively) in preceding decennia, commencing with 1861, were as follows:—1861–70: 341 and 4.70; 1871–80: 350 and 4.72; 1881–90: 318 and 4.73; 1891–1900: 301 and 5.09; 1901–10: 206 and 4.01. Prior to 1911 puerperal nephritis and albuminuria were not classed to pregnancy and childbirth, and consequently the rates shown from 1913 onwards are from 0.22 to 0.25 in excess of what they would have been under the old classification.

† The number of deaths per million living in Holland for 1911–15 (inclusive) was 126.

The number of deaths per million living in Denmark in 1920 was 60, and the number per 1,000 births was 2.35.

The Need of Reconsideration of Diagnosis in Chronic Cases.

DR. CHARLES J. HILL AITKEN (Kilnhurst, near Rotherham) writes: A girl of 20 passed through an illness that, despite a tardy convalescence, was called acute bronchitis. Ten years later, considering herself to be of average health, she studied and took a diploma, qualifying herself thus to earn her living. As her health had deteriorated through her efforts, she rested for a year or two. Then, considering her health restored, she took a post offered her. Being enthusiastic and intelligent, her responsibilities were increased, as also her hours. At the age of 40 she was really a sick person, and for the first time in twenty years she was examined and pronounced phthisical. For ten years she lived a life of semi-invalidism, though reaping the reward of her care of herself, as she was better at 50 than she had been at 40. At this age (50) she resigned herself to a life of semi-invalidism. Then, by chance, on the Continent she consulted a medical man who, with a mind unbiased by her previous history, examined her systematically and decided to enucleate her tonsils, assuring her that she would benefit enormously by the operation. The tonsils were removed a year ago and found on section markedly diseased. A little while back the patient, having enjoyed health to which she had for years been a stranger, was *x*-rayed, and, as the doctor who removed her tonsils expected, her lung was found to present the picture of cicatrization. What had happened was this. Three years ago or thereabouts the lung had healed, but as the symptoms to which the patient was accustomed continued she presumed she was still the victim of phthisis, and but for the reconsideration of her chronic case by a skilled medical man she would have continued her life of semi-invalidism, when only diseased tonsils lay between her and health. The late Professor John Chiene used to say to his students, "Gentlemen, examine your patients." Someone equally well known, whose name I forget, used to say what amounted to "Gentlemen, re-examine your patients." I showed the above to the patient, and she remarked, "Yes. The moral for patients otherwise will be 'Change your doctor.'"

Serum by the Mouth.

DR. R. A. PARKER (East Kew, Victoria, Australia) writes: With reference to the letter published in your issue of May 12th, 1923 (p. 840), I have had no experience of the oral administration of serum in the treatment of diphtheria, but my letter merely referred to prophylaxis. When a member of a household is affected with diphtheria, the oral administration of anti-diphtheria serum to the remainder of the inmates is an efficient and convenient form of prophylaxis, and the method raises no objections from the parents and children. The dose should be one to two thousand units. The important point is that the serum must be sipped slowly and retained under the tongue for a minute or more before it is swallowed.

The Blood Pressure after Operation.

DR. A. LEHRNBECHER (Eberswalde, near Berlin) writes: In his letter published in the BRITISH MEDICAL JOURNAL of May 26th (p. 916) Dr. Edgar Cyriax refers to his investigations on blood pressure, with special regard to differences in the two arms in cases of unilateral conditions, and he states that my own results taken before, during, and after operations are very liable to lead one to wrong conclusions, inasmuch as the readings were taken indiscriminately from either arm. I regret that at the time of my investigations I was ignorant of Dr. Cyriax's publications, as owing to bad economic conditions in Germany the medical journals of other countries are unobtainable. I do not think, however, that this possible source of error has materially affected the value of my results, as it only comes into question when the readings are compared immediately before and immediately after the operation under different conditions—namely, the operating theatre or the ward. The readings during the actual operation and during the ensuing days are of much greater value from the point of view of prognosis, and in my series of cases these were always taken on the same side and under the same conditions. As the factors that influence blood pressure are as yet imperfectly understood, I consider it advisable for all future workers to avoid the source of error referred to by Dr. Cyriax, and to make it an invariable rule to take observations always from the same arm.

Flies in India.

MOST of us are familiar with photographs, sketches, and diagrams illustrating the evil propensities of flies, but a little pamphlet issued by the Public Health Department of the United Provinces of India presents some novel features. It includes eighteen pen and ink sketches of Indian village life and the connexion of flies therewith, and the letterpress consists of a conversation between a villager distressed about his son and a doctor who tells him what he must do to avoid a recurrence of his trouble. Both text and pictures are the work of Mr. A. Sousa, F.R.C.S.Ed., who is Director of Epidemiology in the Province in question.

MESSRS. A. W. GAMAGE, LTD., inform us that they have purchased the entire stock of the Stelastic Tyre Company, and are offering the tyres, which consist of nearly every standard size, at prices much lower than the cost of manufacture.

Vacancies.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 28, 29, 30, 31, 34, and 36 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 32 and 33.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *112*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	9	0
Each additional line	0	1	6
Whole single column (three columns to page) ...	7	10	0
Half single column	3	15	0
Half page	10	0	0
Whole page	20	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429 Strand, London, W.C.2, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.